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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 44.] 1947. [No. 8.

SUMMARY OF RECENT ABSTRACTS.*

VII. HELMINTHIASIS.

Trematodes.

Schistosoma haematobium.—WARD (p. 346) stresses the importance of cystoscopic examination in the diagnosis of urinary schistosomiasis.

BLACK (p. 48) describes two cases in which eggs of *S. haematobium* were recovered by aspiration from small papules which appeared on the skin of patients under treatment; two other patients with *S. haematobium* infections showed similar papules, but eggs could not be found in these lesions [compare FISHBON, below]. BADIR (p. 1154) describes a case in which schistosome eggs (presumably of *S. haematobium*) were found in a conjunctival tumour, and adult worms in an orbital vein. KAMEL (p. 1154) discusses the pathology of this condition, noting that cases have been reported from Upper and Lower Egypt.

S. mansoni.—SAUTET and MARNEFFE (p. 462) found natural infection with *S. mansoni* in *Planorbis adowensis* in the French Soudan. MARIANI-TOSATTI (p. 49) reports three cases of *S. mansoni* infection in Eritrea, and describes the clinical features. The disease is not common there.

WELLER and DAMMIN (p. 1155) state that *S. mansoni* eggs were found in almost 10 per cent. of 19,139 men examined for the forces in Porto Rico. VERSIANI *et al.* (p. 754) report on a survey of *S. mansoni* in the State of Minas Geraes, Brazil; the rate of infestation in towns was 8·6 per cent., in rural areas it appears to be considerably higher. LOBO (p. 938) states that *S. mansoni* infestation is as important as malaria in parts of Brazil, and reports on the situation in Bahia.

WELLER and DAMMIN (p. 347) find that an acid-ether technique is better than zinc sulphate floatation for the detection of *S. mansoni* eggs in faeces. Details of the method are given in the original abstract.

OLIVER GONZÁLEZ and PRATT (p. 348) describe the preparation and use of antigens from adults and cercariae of *S. mansoni*. The worms, or the cercariae, are washed and dried; they are then well pulverized and suspended in physiological saline. After centrifugation this suspension (which is 1 per cent. in strength) is used as the basis for dilutions which are either injected into the skin, or used in a precipitin test. Skin reactions in persons infected with *S. mansoni* were positive up to dilutions of 1 in 200,000, whereas controls, even

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1946, v. 43. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

when infected with other worms, were negative. The precipitin test was rather less sensitive. A positive reaction to the skin test is evident in a few minutes.

From Venezuela, OLIVEROS NAVA (p. 755) reports on the common symptoms, and the results of treatment, in patients suffering from infestation with *S. mansoni.*

SUÁREZ and HERNÁNDEZ MORALES (p. 349) describe five cases in which they claim that there was pulmonary involvement due to *S. mansoni* infection. They think that irreversible changes in the lung may result from this condition if it is not treated at the proper time. In comment, ADAMS remarks that it is not clear to him on what grounds these cases are credited with involvement directly ascribable to their schistosome infestation. JAFFÉ (p. 350) discusses pulmonary schistosomiasis, with special reference to *S. mansoni.* Lesions due to the presence of ova of this worm in the lungs are not uncommon ; he found them in 12 of 50 cases studied, but only rarely are the lesions visible to the naked eye. Ova are also found in the liver and elsewhere. If they are sparse in the lungs they do not give rise to serious symptoms, but they may be extensive enough to cause interstitial pneumonia. If small scattered nodules are seen on radiological examination, the possibility of pulmonary schistosomiasis should be borne in mind.

BARROS (p. 1156) states that *S. mansoni* may give rise to symptoms of involvement of the nervous system, and describes a case. Treatment with Fouadin and thymol apparently put an end to these symptoms. GAMA and DE SÁ (p. 936) report a case in which the spinal canal was blocked by a tumour which, on section, proved to contain eggs of *S. mansoni.* This had caused paraplegia, which responded to treatment by removal of the tumour and by antimonials.

TORRES and PINTO (pp. 658, 1156) have investigated closely an armadillo infected with *S. mansoni,* and conclude that eggs are not excreted from the small intestine, but only from the large, where eggs and granulomata are found in the mucosa. The process of excretion involves the production by the embryo of a histiolytic substance by means of which the walls of the intestinal crypts are lysed to permit passage of the eggs.

KRAKOWER *et al.* (p. 227) describe experiments on the infection of scorbutic guineapigs with *S. mansoni,* in which they observed that the scorbutic state reduced the numbers of eggs produced by the worms, and effected a certain degree of lysis of the eggs, whereby the shells became granular. The tissue surrounding the eggs showed fibrosis.

S. japonicum.—As a result of surveys carried out on the island of Leyte in the Philippines, BANG *et al.* (p. 350) conclude that everybody in the endemic areas of the eastern side becomes infected by *S. japonicum* before the age of 15. The fact that the incidence is lower in adults than in children suggests that immunity may be developed.

AVERY (p. 1046) gives an account of the habitat of *Schistosomophora* (*Oncomelania*) *quadrasi.* MAGATH and MATHIESON (p. 755) have studied the ecology of this snail which is the intermediate host of *S. japonicum* in Leyte. It inhabits the margins of slowly moving water in small creeks, where shade is abundant. Snails become infected mainly in the immediate vicinity of sites where the people defaecate. Of the reservoir hosts, pigs are more important than dogs in infecting snails, and wild rats are unimportant in this respect. The same authors (p. 350) caught wild rats in the Leyte Valley where *S. japonicum* infection is endemic ; 64 of 163 were found to be infected, but eggs were found in the faeces of only 2. The authors think that the blood vessels of the rat's intestine are too small to permit the female worms to enter them, and that the eggs are therefore not discharged in the faeces. These

rats give an indication of distribution of schistosomiasis, but are not themselves important in the spread of the disease.

MAGATH and MATHIESON (p. 756) have investigated the conditions in which eggs of *S. japonicum* will develop and hatch; for details, the original should be consulted. FAUST (p. 758) describes the eggs of *S. japonicum* in relation to maturity. He notes that the embryo secretes an enzyme through the shell, which aids the escape of the egg from the blood vessel and the intestinal tissues. He brings out the point that scrapings of the creamy, or yellowish, pin-point nodules seen at or below the recto-sigmoid junction, will yield eggs.

NELSON and BAYLISS (p. 1046) have devised a sedimentation method for the detection of *S. japonicum* eggs in faeces. This cannot be explained satisfactorily in a short note, and details should be sought in the original.

FAUST *et al.* (p. 756) give a comprehensive account of the clinical features of *S. japonicum* infection as it was seen in American soldiers in the Philippines during the war. Four types—fulminating (often fatal), severe, insidious and asymptomatic—are recognized and described. Complications are due to extension of the lesions, or to secondary infections. In this infection, the accumulation of very large numbers of eggs in the intestine, liver and mesentery, produces the classical changes associated with the advanced disease. The details given in this informative paper should be sought in the original. JOHNSON and BERRY (p. 351) note that the only constant physical sign in a series of cases of *S. japonicum* infection was a tender palpable liver, but they describe small, yellow, nodular lesions which could be seen by sigmoidoscope, particularly at the recto-sigmoid junction, and which contained eggs. The appearance of these is so characteristic that routine biopsy is unnecessary.

CARROLL (p. 1047) describes five cases of *S. japonicum* infestation in which there was cerebral involvement.

FISHBON (p. 1046) reports a case in which eggs of *S. japonicum* were found in biopsies of the skin taken at the sites of a rash which developed in the course of this infestation.

Treatment of schistosomiasis.—ALVES and BLAIR (p. 344) describe their intensive treatment of schistosomiasis with sodium antimonyl tartrate; 100 patients, in Africa, infected with either *S. haematobium* or *S. mansoni*, were treated. The drug is given intravenously, in 6 doses during 2 days, the total dosage being one grain for each 12 lb. body weight. It is essential that the injections (each comprising the drug dissolved in 10 cc. of 5 per cent. glucose saline) should be given slowly, at a rate not exceeding 2 cc. each minute. Under these conditions the authors have not observed signs of toxicity sufficient to necessitate interruption of treatment, but they have observed cough, vomiting, abdominal cramps, salivation and some other manifestations in a few cases; these were not important. They examined all the patients two months after treatment; no eggs were found in either stools or urine. The authors comment on the economic and public health advantages inherent in their short, intensive course. ALVES (p. 752) later modified this treatment so that it could be completed in one day; 6–8 grains of sodium antimonyl tartrate are given in 3 or 4 doses, at intervals of 4 or 3 hours respectively. The results in 131 Africans were very satisfactory, and the author makes the point that in this way an infected population may be rapidly disinfested, at least for a time.

KHALIL BEY *et al.* (p. 50) refer to an outbreak of jaundice which occurred in 3 per cent. of 8,000 persons treated for schistosomiasis with intravenous tartar emetic. They suspect that this was a syringe-transmitted infection, and it was dealt with by the introduction of adequate sterilization methods.

GONZALEZ RINCONES (p. 937) has devised a method of administering tartar emetic by the mouth, in the form of pastilles, and reports good results from their

use in *S. mansoni* infestation. MASON *et al.* (p. 1157) note that treatment with tartar emetic is much more effective than treatment with Fouadin in *S. japonicum* infestation. They emphasize the fact that repeated stool examinations may be needed before diagnosis can be made.

In a series of 157 cases of *S. mansoni* infection in Porto Rico, treated with Fouadin by HERNÁNDEZ MORALES (p. 462), cure was obtained in some 50–60 per cent. after one or more courses of the drug. Some toxic reactions to Fouadin were encountered. TARR (p. 657) has examined by electrocardiograph certain patients with schistosomiasis, who were being treated with tartar emetic or Fouadin. Changes were seen in a few, which might lead to a wrong diagnosis of myocardial damage; these disappeared on cessation of the treatment, but treatment was not changed because of them.

MILLS (p. 346) reports good results in *S. haematobium* infections treated with Stibophen or Anthiomaline; he stresses the importance of cystoscopic control throughout the course of treatment.

HERNÁNDEZ MORALES *et al.* (p. 1045) have treated *S. mansoni* infections with intensive courses of urea stibamine, and report favourably on the results. Details should be sought in the original.

Control of schistosomiasis.—JANSEN (p. 938) reports on the campaign against *S. mansoni* in Pernambuco, in which tartar emetic and other antimonials are used on a large scale for therapy, and lime is used for treatment of water. The intermediate host is *Australorbis centrimetralis.*

BARLOW and ABDEL AZIM (p. 753) show that the methods of snail eradication used in Egypt (clearance of weeds and snails by various means, and the use of copper sulphate) have been successful in greatly reducing the numbers of snails in canals, drains and streams. A comprehensive plan has been drawn up for snail eradication along the Nile from Asswan to the sea.

As a result of tests on chlorination of water, OLIVER GONZÁLEZ *et al.* (p. 347) conclude that with a minimum period of exposure of 20 minutes, a chlorine solution yielding a minimum chlorine residual of 0·5 p.p.m. may be sufficient to render cercariae of *S. mansoni* non-infective.

Schistosome dermatitis.—MCMULLEN and BEAVER (p. 138) have identified the adults of *Cercaria physellae, C. elvae* and *C. stagnicolae* as *Trichobilharzia physellae, T. ocellata* and *T. stagnicolae* respectively. The first two develop in ducks and other birds, but the third has been found to reach maturity in canaries only. The most common natural hosts are migratory birds.

DESPORTES (p. 759) reports swimmers' itch in Indre-et-Loire, France.

Other trematodes.—LAVIER and STEFANOPOULO (p. 463) have prepared antigens from *Fasciola hepatica* for an intradermal and a complement fixation test, and have found them to be specific in 5 patients suffering from that infestation, whereas antigens from filariae, and *Echinococcus* fluid, gave negative results. They remark, however, that antigens from schistosomes (which they did not test) might give positive results in *Fasciola* infestation, because the two genera are closely related. MARTIN *et al.* (p. 464) describe a case of *F. hepatica* infestation in which the diagnosis was made by duodenal intubation, as a result of which eggs were found. The symptoms included persistent fever, pain and vomiting, but painful enlargement of the liver, usually regarded as one of the cardinal symptoms, was absent. Treatment with emetine appeared to be successful. HILLEMAND *et al.* (p. 658) report a case of *F. hepatica* infection in which treatment with emetine was apparently very successful.

TUBANGUI (p. 852) has found cysts of *Paragonimus* in crabs (*Potamon* spp.) in the Philippines, and notes that in crabs, commonly eaten uncooked, such cysts are likely to be alive and infective. The molluscan host in the area is apparently not yet known.

CAMERON (p. 1048) discusses the parasites carried by freshwater fish in Canada, including certain trematodes and cestodes which infest man.

Cestodes.

HARRIS and HICKEY (p. 138) discuss the occurrence of Diphyllobothriids in Ireland; they have proved that *D. latum* may be found in perch from a lake in County Leitrim.

ELSAESSER (p. 228) discusses the symptoms, diagnosis, and treatment of cerebral cysticercosis, and gives an account of 8 cases. Details should be sought in the original. EDWARDS (p. 659) records a case of cerebral cysticercosis without epilepsy, in which the incubation period was at least 12 years. There was disturbance of vision at one time, but later the only symptom was slight headache.

BARNETT (p. 352) has reviewed progress in the knowledge of hydatid disease (to which he made so many contributions himself); the many points in this paper cannot satisfactorily be summarized further, and should be sought in the original.

COLE (p. 566) gives an account of human hydatid disease in Victoria, Australia. In the main it is restricted to sheep country, and sheep in some places are infested to the extent of 71 per cent. Dogs are infested by eating uncooked offal from slaughterhouses.

LASNIER and CASSINELLI (p. 567) claim that by examination of sputum, fragments of cyst-wall and minute cocco-bacillary bodies can be seen in patients with unruptured hydatid cyst of the lung, and the diagnosis can thus be made.

GRAÑA (p. 139) discusses allergy and anaphylaxis in relation to hydatid disease and to biological tests, summing up much of the literature on the subject. The Casoni test and the complement-fixation test (Ghedini-Weinberg) are useful, but may give false positive results in certain conditions. The formation of heterophile antibodies after injection of hydatid fluid may have a certain diagnostic value. If these various tests are negative, the triple response to 2 cc. hydatid fluid injected intradermally each day for 5 days, into a separate part of the skin, is estimated. If a negative complement-fixation becomes positive, within 96 hours of the beginning of the test, and if the blood eosinophilia exceeds 5 per cent., hydatid should be suspected; 5–10 days later an increase of agglutination of sheep erythrocytes, at a titre of more than 1 in 32, again strongly indicates hydatid disease. He points out that persons with hydatid cysts quite often exhibit asthma or other allergic states; anaphylactic shock may occur if a hydatid cyst ruptures and much antigen is absorbed by a sensitized person—sensitization probably occurs through leakage of fluid through the cyst wall into the tissues of the host. But hydatid fluid is also, probably, a primary toxin to body cells.

BERBERIAN (p. 939) writes favourably of the effect of the synthetic acridine derivative Acranil, in the treatment of *Hymenolepis nana* infestation.

LARSH (p. 759) has investigated the effect of repeated administration of alcohol in relation to infestation of mice with *Hymenolepis nana* var. *fraterna*.

SHUMEIKO (p. 48) found 44 onchospheres of tapeworms on 210 samples of vegetables examined from the markets of Samarkand; 4 threadworm eggs were also seen.

Charles Wilcocks.

[*To be continued.*]

MALARIA.

SERGENT, Ed., SERGENT, Et. & COLLIGNON, E. Du danger de "l'apport de virus palustre étranger" dans une contrée assainie. [**The Danger arising from the Introduction of Foreign Malaria Strains in Controlled Areas.**] *Arch. Inst. Pasteur d'Algérie.* 1946, Sept.–Dec., v. 24, Nos. 3/4, 199–204, 3 figs.

In the Ouled Mendil marsh in Algeria the splenic index in 1906 was 15; in 1907, 19; and in 1908, 53 per cent. The threshold of "plasmodic danger", which in Algeria corresponds to a splenic index of 10 per cent., was thus largely exceeded. The systematic administration of quinine in preventive doses caused a rapid improvement, and up to 1936 the spleen index remained well below 10 per cent. except for two or three occasions on which a rise in the index coincided with the arrival of strangers infected with malaria elsewhere. From 1936 to 1944, this population was kept under closer observation in order to study in greater detail the effects of these immigrations on the level of the local endemicity. At this period, the anopheline breeding grounds had been suppressed or kept under control, and healthy labour imported to drain and cultivate the soil remained free from malaria. Endemic indices for 1936–38 and 1941–44 are given in graphic form. Oscillations in the curves are all attributable to imported infections which were numerous at times. Local transmission did not take place. Had not the prevalence of the vector species of anophelines been reduced well below the danger level, epidemic malaria might well have broken out. *Norman White.*

PAYNE, E. H. & SANCHES, A. **A Short Statistical Study of 60,000 Dispensary Patients treated in the Interior of Brazil, 1944–1945 (North Central Minas Geraes, Goias and North-West Baía).** *J. Trop. Med. & Hyg.* 1947, May, v. 50, No. 5, 90–93, 6 charts & 1 map.

During the war, minerals were required from remote areas of the States of Minas Gerais, Goias, and Bahia, Brazil. There was no existing medical service for the sparse populations of these areas, but it was known that malaria and other serious diseases were endemic there. For the protection of the industrial population engaged in the mining of the mica and quartz required, 22 dispensaries were set up. The authors give brief notes on 60,000 patients treated at these dispensaries. The chief diseases were malaria (22 per cent.), intestinal helminthiasis (11 per cent.), influenza (10·6 per cent.), venereal diseases (7·6 per cent.), dysentery (3·4 per cent.) and tropical ulcer (2·1 per cent.). *Anopheles darlingi* was the most important vector of malaria, but in some places the disease was transmitted by another, unidentified, species. The highest incidence was in April, after the rains. Both *P. vivax* and *P. falciparum* were found. There is nothing unusual about the other diseases, but this note is interesting since it is the first record of the diseases of these remote areas.

Charles Wilcocks.

GLAGOLEVA, E. M. [**On the Ecology of Larvae of Anopheles in Tadjik S.S.R. 6 Biotopes of *Anopheles plumbeus* Steph. and their Chemical Properties.**] *Med. Parasit. & Parasitic Dis.* Moscow. 1946, v. 15, No. 5, 60–67. [24 refs.] [In Russian.]

SIDDONS, L. B. *Anopheles stephensi* **as a Vector of Malaria in Calcutta.** *J. Malaria Inst. of India.* 1946, Dec., v. 6, No. 4, 367–76.

Because of the occurrence late in 1942 of cases of malaria of household origin in central Calcutta, an enquiry was started in May 1943 which revealed a definite increase in locally acquired infection. The author cites several examples occurring up to 1945, which he attributes to the influx of large groups of gametocyte-carriers during the transmission season and to local intensified breeding of *Anopheles stephensi* (type form).

Collection of mosquitoes was done almost entirely in houses; stables were usually ignored. Seven species of *Anopheles* were taken of which *A. stephensi* formed 87·3 per cent. (2,244 specimens), and this was the only species found infected (nine out of 1,052 examined); its total infection rate was 0·85 per cent. (oöcyst rate 0·58 and sporozoite rate 0·56 per cent.). The transmission season is stated to be from late July to late September.

Discussing the number and relative incidence of the members of the vector species recorded in this survey, the author points out that about 80 per cent. of the catch of *A. stephensi* was made in a single resting-place and that very little collecting was done in stables where other anophelines were common; and that, while there is no evidence of a general increase in the population of *A. stephensi*, local increases undoubtedly occur and lead to restricted outbreaks.

H. S. Leeson.

AITKEN, T. H. G. **Studies on the Anopheline Complex of Western America.** *Univ. California Publ. in Entom.* 1945, v. 7, No. 11, 273–364, 39 figs. [11 pages of refs.]

A very full account is given in this work of the anopheline fauna of western America, and especially of California. The mosquitoes studied comprise *Anopheles maculipennis occidentalis* and *A. m. freeborni*, *A. pseudopunctipennis franciscanus* and its variety *boydi*, and *A. punctipennis*.

The author includes a complete synonymy, as well as descriptions of all stages and keys to their identification. He describes and tabulates morphological differences between related forms and illustrates important details of anatomy by drawings and photographs. Some account is also given of bionomics and disease relationships.

A. m. freeborni is the brown unicolorous form found in the warm, irrigated western regions west of the Divide, and is the most important vector of malaria, though the evidence for this is mainly epidemiological.

A. m. occidentalis is the silver- or bronze-tipped melanic form of the cool western sea-coasts and is of little or no importance.

The status of the Mexican form (*A. m. aztecus*) as a malaria vector is disputed.

A. pseudopunctipennis is a variable mosquito in its morphology, its biology and in its disease-transmitting capabilities. The author considers that the true form of this species does not occur in California but is found in more southerly regions. Those present in California are *A. p. franciscanus* and its variety *boydi*, neither of which is a malaria vector.

A. punctipennis is known to be susceptible to infection by *Plasmodium*, but as a natural vector it is of little importance.

The author suggests that laboratory colonies of these mosquitoes be established to facilitate interbreeding experiments, to investigate relationships between the forms of *Anopheles maculipennis* and *A. pseudopunctipennis* respectively, and to enable their susceptibility to plasmodial infection to be determined as present knowledge is based almost entirely on epidemiological evidence.

H. S. Leeson.

HUNT, R. & DAVEY, Pauline. **Maintenance of** *Anopheles quadrimaculatus* **(in the Laboratory).** *J. Trop. Med. & Hyg.* 1947, Mar., v. 50, No. 3, 53–6, 2 figs.

A colony of *Anopheles quadrimaculatus* is maintained in two adjoining rooms which have a connecting door ; adults are kept in one and larvae in the other. Temperatures in the adult room are kept between 24° and 26°C. and relative humidity is from 75 to 85 per cent. In the larva room, temperature is 26·5°C., giving a water temperature of 25°C.

Eggs are removed daily from the adult cages about eight hours after they are laid, and are left on damp filter paper for twenty-four hours. They are then floated on to tap water in the hatching pans, and four hours later dried powdered brewer's yeast and dehydrated brain-heart infusion are added in the proportion of 1 mgm. of each to 30 ml. of water. After twenty-four hours, 25 mgm. of powdered dog-biscuit are added to each pan. Next day, young larvae are counted into the rearing pans, in which the water is about two inches deep ; and yeast and brain-heart infusion are added in the proportion of 1 mgm. of each to 60 ml. of water. The optimum surface area per larva is given as 0·75 square inches. Dog-biscuit is given twice daily, the amount increasing from 16 to 160 mgm. per 100 larvae each day until the ninth day. Scum is dispersed by a jet of water.

Pupae are concentrated into one large dish, after carefully siphoning off the excess water, and the dish is put into an adult cage. A safety curtain hangs inside the cage doors to prevent adults escaping when animals are put inside, and the cages are covered with a black cloth to darken them and to reduce draught. At first the mosquitoes are fed on 5 per cent. glucose, but when blood meals commence the glucose is removed and the males die off. Three days later, bowls of water containing cones of filter paper are put in for the egg-laying females.

The maximum rate of production is 3,000 to 4,000 female mosquitoes every 11 or 12 days, requiring the work of two people for two hours a day for six days and for one hour on Sundays. *H. S. Leeson.*

YOUNG, M. D. & BURGESS, R. W. **The Transmission of** *Plasmodium malariae* **by** *Anopheles maculipennis freeborni.* *Amer. J. Trop. Med.* 1947, Jan., v. 27, No. 1, 39–40.

Experimental transmission of a strain of *Plasmodium malariae* by *Anopheles quadrimaculatus* has previously been effected ; the authors now record its transmission by *A. maculipennis freeborni*, from a patient who had been infected by injection of blood. The mosquitoes were kept at about 75°F. for 32 days after the infective blood meal ; one patient was bitten by 3 infective *A. m. freeborni* and one by 3 infective *A. quadrimaculatus.* Both patients became infected. *Charles Wilcocks.*

TWINN, C. R. **Report on the 1944 Anopheline Mosquito Survey in Canada.** *Processed Publ. Div. Entom. Dept. Agric. Canada.* Ottawa. 1944, Dec. 30, No. 17, 52 pp., 2 maps.

Mosquitoes were collected from light traps, and also in the course of field surveys, for a radius of two to three miles around hospitals and camps throughout the Dominion of Canada, between 15th July and 15th September, 1944.

From light traps 19,248 mosquitoes were obtained, of which less than one per cent. were anophelines ; 5,500, mainly larvae, were taken in the field and of these, 35 per cent. were anophelines ; some adults were bred from larvae.

Of sixty species of mosquitoes known to occur in Canada, 27 were taken during this late season survey ; 19 species were collected from traps and 26 from field collections. All species in the traps were found in the field except one, a culicine (*Theobaldia alaskensis*) from British Columbia.

Four species of *Anopheles* were taken, namely, *A. occidentalis, punctipennis, quadrimaculatus* and *walkeri* ; the distribution records for these four are tabulated and shown on a map. In addition, published and unpublished records (including those of a fifth species *A. freeborni* [*A. maculipennis freeborni*] from British Columbia) are also listed and mapped.

Detailed reports from each district give the species obtained, with remarks on their abundance or scarcity, character of breeding places and nature of terrain.

The most widely distributed species, *A. occidentalis*, is recorded for the first time from Nova Scotia and New Brunswick. *A. punctipennis*, though not so widely distributed, was more common than *occidentalis* in some places. *A. quadrimaculatus*, "the common malaria mosquito", seemed to be confined to the southern parts of Ontario and Quebec. *A. walkeri* was more attracted to the light traps than was *A. quadrimaculatus*, and while it was previously known only from Quebec, Ontario and Manitoba, this survey revealed its presence also in Nova Scotia, New Brunswick and on Vancouver Island. *A. m. freeborni*, the other malaria vector, was not collected but it had previously been recorded from British Columbia. *H. S. Leeson.*

GALLIARD, H. & NGU, D. V. Biologie et description d'*Anopheles tonkinensis* Galliard et Ngu 1940. [**Biology and Description of** *Anopheles tonkinensis*.] *Ann. Parasit. Humaine et Comparée.* 1946, v. 21, Nos. 5/6, 294–301, 3 figs.

ALEXANDRE. A propos d'un cas de fièvre tierce bénigne. [**A Case of Benign Tertian Malaria in Belgium.**] *Arch. Service de Santé de l'Armée Belge.* 1947, Jan.–Feb., v. 100, Nos. 1/2, 38–9.

A puzzling case, eventually diagnosed by blood examination, in an ex-soldier in Belgium who had served in the Ukraine (Pripet Marshes).

EINHORN, N. H. **Tertian, Quartan and Mixed Malarial Infections. A Survey of Three Hundred and Thirty-four Cases of Infection with** *Plasmodium vivax*, **Ten Cases of Infection with** *Plasmodium malariae* **and Eight Cases of Mixed Malarial Infections in Children.** *Amer. J. Dis. Children.* 1947, Jan., v. 73, No. 1, 55–86, 3 figs.

This study of the reaction of childhood to malaria infections relates to children admitted to the Gorgas and Colon Hospitals, Ancon and Cristobal, Canal Zone, during a six-year period. The 493 children with *P. falciparum* infections were the subject of a previous report [this *Bulletin*, 1947, v. 44, 393]. The present study deals with 334 children infected with *P. vivax*, 10 with *P. malariae* and 8 with mixed infections. Twenty per cent. of the children with *P. vivax* infections had had at least one attack of malaria by the end of the second year of life. The malaria in 117 out of 334 children with *P. vivax* malaria was associated with intestinal helminthiasis. Cerebral and algid forms of *P. vivax* infections are rare. Enlargement of the spleen and liver, anaemia and subnormal weight were common in recurrent malaria ; associated infections may have been partly responsible. Deaths from *P. vivax* malaria are uncommon : there was no death in this group of 334 cases. Quinacrine hydrochloride (mepacrine) is highly effective in the treatment of all forms of malaria in children.

Norman White.

WINCKEL, C. W. F. Abaissement du nombre des récidives chez les paludéens des Pays-Bas. [**Reduction in the Relapse Rate of Malaria in the Low Countries.**] *Rev. Paludisme et Méd. Trop.* 1947, Apr. 15, v. 5, No. 35, 97–9.

A remarkable increase in the incidence and relapse rate of benign tertian malaria has occurred in recent years in the Low Countries, where the disease is endemic. For some time, various workers in Holland had been employing SINTON's well-known combination of plasmoquine and quinine treatment in the prevention of relapses: unpublished work of Dr. J. T. BIJLMER is quoted to indicate the satisfactory results obtained between 1940 and 1943 in this way; for example, 24 per cent. of 156 patients showed parasite relapses when treated with quinine and plasmoquine as compared with 62 per cent. of 298 treated with quinine alone; the clinical relapses were respectively 10 and 48 per cent.

When German supplies of plasmoquine ceased, the Low Countries were reduced to employing quinine alone; and as a result, relapses became more frequent: arrangements have now been made for the importation of pamaquin from Britain in the form of pamaquin naphthoate.

The Netherlands authorities have now provided doctors and pharmacists with tablets each containing 150 mgm. of quinine sulphate and 9 mgm. of pamaquin. The adult dose is 5 to 6 tablets daily with proportionate reductions for children. Treatment is continued for 14 days: it is found that the relatively small daily dose of quinine (less than 1·0 gm.) is adequate. The toxic properties of the plasmoquine group are noted, but they are rarely found with the course of treatment described, especially if the precaution is taken to see that they are not taken on an empty stomach. The importance of ensuring that the full course is taken regularly by patients is stressed.

The author hopes that this form of treatment will serve to reduce the number of relapses of benign tertian malaria in the Low Countries. [The large amount of experimental work on the newer antimalarial drugs, reviewed in this *Bulletin* during the last year, indicates a more satisfactory future approach to the problem of dealing with relapses.] *H. J. O'D. Burke-Gaffney.*

BANG, F. B., HAIRSTON, N. G., TRAGER, W. & MAIER, J. **Treatment of Acute Attacks of Vivax and Falciparum Malaria. A Comparison of Atabrine and Quinine.** *Bull. U.S. Army Med. Dept.* 1947, Jan., v. 7, No. 1, 75–89, 10 figs. [Refs. in footnotes.]

This comparative study of the value of mepacrine and quinine in the treatment of malaria was carried out on white, non-immune, well-nourished soldiers who were infected during campaigns in New Guinea. The dosages of mepacrine administered were: 1·2 gm. the first day; 0·8 gm. the second day, then 0·4 gm. each day for four days; 3·6 gm. in all. The dosage of quinine dihydrochloride in solution, was 3 gm. a day for three days and then 2 gm. a day for the next three days.

Eighty-nine patients with *P. vivax* infections were treated with quinine alone and 367 with mepacrine alone. Mepacrine was superior to quinine, but the difference was less than the effect of immunity conferred by a few previous attacks of malaria.

One hundred and four patients with *P. falciparum* infections were treated with quinine and 99 with mepacrine. Both fever and parasites disappeared rapidly under both forms of treatment, and there was no significant difference of response to the two treatments.

Six of 110 patients treated with mepacrine developed cerebral symptoms on the 5th or 6th day of treatment, after the infection had been controlled. Four of these patients had manic states with confusion and two had an epileptiform

convulsion. Recovery was complete in all cases after from 12 to 48 hours. Mepacrine levels in these cases did not differ significantly from the average in the series. *Norman White.*

CUSTER, R. P. **Aplastic Anemia in Soldiers treated with Atabrine (Quinacrine).** *Amer. J. Med. Sci.* 1946, Aug., v. 212, No. 2, 211–24, 4 charts & 14 figs.

Aplastic anaemia was the cause of a disproportionately large number of deaths in the south and south-west Pacific areas where mepacrine therapy for malarial suppression was rigidly enforced. In these areas, during 1943 and 1944, the incidence of the disease was nearly 2½ times as high as among troops not taking the drug, and it showed a rapidly and steadily progressive increase with each succeeding half-year period. The actual number of cases was, however, infinitesimal compared with anticipated morbidity and mortality from malaria had suppressive therapy not been employed.

In 57 cases studied in detail, no correlation was found between the anaemia and the administration of any drug other than mepacrine, or exposure to any other aetiological factor; in 25 cases the anaemia was preceded by the atypical lichen planus which has been suggested also to be associated with the administration of mepacrine.

After a prodromal period of weakness, the disease became manifest clinically by haemorrhages, from the mucous membranes and into the skin, associated with fever. The patients were rather pallid and blood examination showed varying degrees of anaemia, generally normocytic and normochromic, without material reticulocytosis; the leucocyte and thrombocyte counts were significantly low. Examination of the bone marrow showed depletion of normal haematopoietic elements often almost complete; there was no evidence of extramedullary haematopoiesis. It is suggested that the condition may be due to a slowly acquired hypersensitivity, the antigen possibly being formed through interaction of drug and protein. *F. Murgatroyd.*

JOHNSTONE, R. D. C. **Paludrine in Relapsing Benign Tertian Malaria. Further Trials.** *Lancet.* 1947, May 17, 674–5.

Following trials with paludrine [see this *Bulletin*, 1947, v. 44, 284] a further series of cases of benign tertian malaria were treated at Colchester with combination of paludrine and quinine. Most of the patients had probably been infected in India or Burma: a few had been exposed in the Far East and other areas.

In all, 61 patients were treated on the following courses, on an alternate-case basis.

(1) Quinine gr. 10 and pamaquin 0·01 gm. t. d.s. for 10 days.

(2) Quinine gr. 10 and paludrine 0·25 gm. t.d.s. for 10 days.

Follow-up records were obtained in 58 out of the 61, over a period of six months.

Results of Treatment.

Course	No. of cases	No relapse	Proved relapse	Clinical relapse*	Percentage of proved relapses	Percentage of total relapses
Quinine and paludrine	29	18	3	8	10·3	37·9
Quinine and pamaquine	29	24	2	3	6·9	17·2

* The criteria of clinical relapse includes the history of a rigor and a tertian periodicity of symptoms.

The average intervals between the date of arrival in U.K. and the date of admission to hospital were, for quinine-paludrine 4·8 months, and for quinine-pamaquin 4·1 months.

The average intervals between treatment and further relapse were, for quinine-paludrine 3·6 months, and for quinine-pamaquin 3·7 months.

It had previously been thought that paludrine gave a longer period of freedom than did the combined pamaquin-quinine combination, but this suggestion has not been borne out. The possibility that paludrine may have a synergistic action similar to that of pamaquin has not been confirmed.

P. Manson-Bahr.

BLASCHKO, H., CHOU, T. C. & WAJDA, Isabelle. **The Inhibition of Esterases by Paludrine.** *Brit. J. Pharmacol.* 1947, June, v. 2, No. 2, 116–20. [13 refs.]

HALAWANI, A., BAZ, I. & MORKOS, F. **A Preliminary Report on the Anti-malarial CAM-AQI.** *J. Roy. Egyptian Med. Ass.* 1947, Feb., v. 30, No. 2, 99–103.

CAM-AQI is described as a quinoline derivative containing an aniline radicle. Its formula and properties are described and it is claimed that (1) it is several times as active as quinacrine in avian malaria, (2) it is readily absorbed from the intestinal tract, but is distributed in higher concentrations in the tissues than in the plasma, (3) it causes little staining, (4) it is extensively degraded in and slowly excreted from the body, (5) it is about one-quarter to one-half as toxic as quinacrine in laboratory animals, and produces similar pathological changes in them after prolonged administration, (6) in man, 1 gm. of the drug in 24 hours did not produce toxic symptoms, but caused "complete interruption" of benign tertian malaria. The source of manufacture is not stated.

The author tested CAM-AQI in 42 patients, 30 of whom were followed up. Four treatment schedules were tried, with varying initial and subsequent doses, the total courses given amounting to between 8 and 10 tablets, each containing 0·05 gm. Doses were spaced at 12-hour intervals.

Among the 42 patients, 39 were suffering from benign tertian and 3 from subtertian malaria. Two patients received the whole course of 0·4 gm. in two doses within 12 hours without deleterious effects. Most of the others received an initial dose of two tablets (0·1 gm.), followed by a further two every 12 hours for three doses.

In general, vegetative forms of the parasites disappeared by the 2nd day, but *P. vivax* gametocytes persisted in some cases for five days: the drug did not seem to be active against *P. falciparum* gametocytes. Weekly blood examinations were made in the "follow-up" cases for 3 to 5 months: no parasitological or clinical relapses were observed.

Toxic symptoms following the use of the drug are described as "trivial, rare and of brief duration". They included vomiting, diarrhoea, tenesmus, palpitations and fainting: in some cases acceleration of the heart rate occurred, but this was resolved on the second or third day. The toxic symptoms were not apparently related to dose, age or weight: no staining of the skin was seen: one patient was six months pregnant, and was cured of her malaria without showing any ill effects from the drug.

[A drug for which such satisfactory claims are made requires to be investigated more fully, in greater detail and with adequate controls.]

H. J. O'D. Burke-Gaffney.

CURD, F. H. S. & RAISON, C. G. **Synthetic Antimalarials. Part XIII. Some N-Dialkylaminoalkylamidines.** *J. Chem. Soc.* 1947, Feb., 160–64.

WORK, T. S. **The Synthesis of Antimalarial Compounds related to Niquidine. Part III. Alternative Synthesis of Dihydro-x-niquidine.** *J. Chem. Soc.* 1947, Feb., 222–4.

CURD, F. H. S., LINDQUIST, J. K. & ROSE, F. L. **Synthetic Antimalarials. Part XII. Some 1 : 3 : 5-Triazine Derivatives.** *J. Chem. Soc.* 1947, Feb., 154–60.

CHENG FANG TSU. **Chang Shan in the Treatment of Malaria.** *J. Trop. Med. & Hyg.* 1947, Apr., v. 50, No. 4, 75–7.

TONKIN and WORK [this *Bulletin*, 1946, v. 43, 1012] reported that the indigenous Chinese drug *chang shan* was effective against *P. gallinaceum* infection in chicks.

The present author investigated the drug, which has been in use in China for more than 2,000 years, in hospital patients suffering from different varieties of malaria. The immediate vomiting characteristic of the action of the drug was eliminated by the use of an alcohol-soluble fraction, freed from alcohol and dissolved in water, and the employment of a maximum single adult dose of 5 ml. of a 6 per cent. solution (0·3 gm. solids). In doses in excess of this, abdominal discomfort or vomiting occurred in about 10 per cent. or more of adult patients.

The usual daily dose finally adopted was 25 ml., corresponding to 1·5 gm. of extract or 25 gm. of dried *chang shan* root. This dosage was given for 12 to 15 days in benign tertian malaria and for 20 days in subtertian. Administration by the mouth was usual, but intramuscular injection did not produce an unduly severe local reaction in the few cases in which it was used. Gastric symptoms were further prevented by pre-medication with bismuth subnitrate or hyoscyamus and sodium bicarbonate. No other secondary effects were observed, even with an augmented dose of 8 ml. five times daily.

Among 587 outpatients, 67 per cent. of 322 benign tertian infections and 63 per cent. of 253 subtertian infections were apparently cured and the patients rendered free of parasites by the use of *chang shan* extract.

In hospital patients, controlled tests were made, on the basis of disappearance of symptoms, reduction or disappearance of splenic enlargement and disappearance of parasites from thick blood films. In 67 patients with benign tertian malaria, symptoms subsided between the 1st and the 6th days in 97 per cent.; they subsided by the 3rd day in 64 per cent. of these. Parasites disappeared between the 3rd and the 6th day in 88 per cent., averaging 22 per cent. for each day; a further 12 per cent. lost their parasites by the 7th day, so that all were parasite-free within a week. Splenic enlargement disappeared between the 4th and the 9th day in 54 per cent., diminished thereafter in 10 per cent. and persisted in the remainder after 10 days. Relapse occurred in 6 of the 67 patients. In the case of 14 patients with subtertian malaria, treatment was successful in 11 by the 2nd or 3rd day: in a further 22, a combination of *chang shan* extract and plasmoquine resulted in 16 cures, as judged by the criteria quoted.

Comparative studies of *chang shan*, quinine and of a tonic only were made in three groups of patients suffering from benign tertian malaria, in order to exclude cure by natural immunity. In 12 of the first group, fever subsided on the 1st or 2nd day and parasites disappeared before the 7th: in the three patients treated with quinine, fever subsided before the 4th day and parasites disappeared by the 7th. In only one of the 8 control cases, was a negative blood picture obtained; in three of these cases, fever subsided on the 2nd, 5th and 7th days, respectively, and was still recurrent on the 10th day in the remainder.

It was noted that, in a number of cases, morphological and staining abnormalities in the plasmodia occurred in blood films taken 4 to 48 hours after administration of *chang shan.*

The encouraging results described by the author merit further trials of this drug, which may well prove to have a real value, especially where it is available and proprietary antimalarials are not. *H. J. O'D. Burke-Gaffney.*

PARROT, L., CATANEI, A. & COLLIGNON, E. Nouveaux essais de prophylaxie collective du paludisme par les médicaments synthétiques (troisième mémoire). [**Further Trials of Mass Prophylaxis of Malaria with Synthetic Drugs.**] *Arch. Inst. Pasteur d'Algérie.* 1946, Sept.–Dec., v. 24, Nos. 3/4, 205–78, 39 diagrams.

In 1944 the authors published the results of a trial to control malaria in a highly malarious area at the mouth of the Réghaïa wadi, in the Department of Algiers, by the weekly administration of either quinacrine or premaline S to all its inhabitants, throughout the transmission season [this *Bulletin*, 1945, v. 42, 445]. The general conclusion reached was that neither drug, in the doses used, was capable of controlling clinical malaria; the usual seasonal epidemics of malaria occurred among the recipients of quinacrine and premaline S alike. In 1944 and 1945, a comparison of the prophylactic value of the two preparations was tested once again but this time the drugs were administered twice weekly, the total amount of drug administered being one-third greater than on the previous occasion (0·1 to 0·2 gm. of quinacrine twice weekly; one to two tablets of premaline twice weekly, according to age; a tablet of premaline S contains 0·1 gm. quinacrine and 0·01 gm. of praequine [plasmoquine]). Forms of the drug suitable for their administration to young children were not available. Consequently, children below four years of age received quinine bihydrochloride, or aristochine, twice weekly, in doses admittedly insufficient; staff was insufficient to allow of the administration of drugs more frequently than twice a week. This inadequately controlled reservoir of infant infection placed the older age groups, recipients of the synthetic drugs to be compared, in less favourable epidemiological conditions than in previous trials.

The observations are recorded in very great detail. Both drugs afforded a high degree of protection; the outbreaks of malaria in both years were mild. The carriers of gametocytes were fewer among the recipients of premaline than in the quinacrine group, but the gametocide action of premaline exercised insufficient influence on the evolution of malaria among its recipients to justify the association of praequine with quinacrine in the mass drug prophylaxis of malaria in Algeria. *Norman White.*

KNOWLES, F. L. **A Definition of Malaria Control.** *J. National Malaria Soc.* 1946, Dec., v. 5, No. 4, 233–43, 1 fig. [13 refs.]

The author sets out to define, not malaria control, but the factors involved in malaria transmission and the effect of their modification on the incidence of malaria. He reviews the mathematical basis of transmission on lines which will be familiar to readers of Ross's *Prevention of Malaria.* From this, he makes deductions on the number of mosquitoes necessary to ensure the continuation of transmission in populations containing various proportions of gametocyte carriers. He also sets out to assess the relative value of different methods of malaria control, such as adult mosquito destruction and the prevention of breeding.

[In neither case does the reviewer arrive at the same deductions as the author. The whole approach to malaria transmission discussed is vitiated by failure to

take into account the normally self-curing nature of the disease. While the reviewer agrees that destruction of adult mosquitoes is one of the most effective means of malaria control, he does not consider that this fact can be deduced from the mathematical data provided.] *G. Macdonald.*

GUILLAUME, A. La lutte contre les moustiques en Alsace. Complexité du problème. [**Anti-Mosquito Measures in Alsace.**] *Rev. Paludisme et Méd. Trop.* 1947, Apr. 15, v. 5, No. 35, 101–4.

COLLIGNON, E. La campagne antipaludique de 1945 dans le département d'Alger. [**Antimalaria Campaign of 1945 in the Department of Algiers.**] *Arch. Inst. Pasteur d'Algérie.* 1946, Sept.–Dec., v. 24, Nos. 3/4, 279–88.

The department of Algiers suffered but little from malaria in 1945, meteorological conditions being generally unfavourable to anopheline propagation. The prevalence of malaria in this region is largely determined by the rainfall in the second half of the preceding winter and in the first half of the spring. In 1945, the rainfall in these months was but one-fifth of the average. The few isolated outbreaks determined by local conditions were of short duration. Antimalarial work was hampered by lack of transport. *Norman White.*

WEATHERSBEE, A. A. **Malaria Control Activities during the Construction of an Advanced Tropical Naval Base.** *J. National Malaria Soc.* 1946, Dec., v. 5, No. 4, 263–76, 8 charts.

The construction of some naval bases in the Caribbean region was seriously impeded by outbreaks of malaria. The assistance of malariologists was sought, a full survey was carried out and a complete control scheme introduced. The methods of survey and control were of standard types. The paper is of interest for its account of the application of these methods under the special circumstances of the Caribbean region. Control was completely effective and resulted in the virtually complete elimination of anophelines (*A. albimanus*) and malaria from the area. *G. Macdonald.*

MACINNES, D. G. **On the Effect of DDT-Treated Surfaces on Adults of** *Anopheles gambiae* **and** *A. funestus.* *Bull. Entom. Res.* 1947, May, v. 38, Pt. 1, 123–30, 1 fig.

The toxicity of DDT-containing larvicidal oils to adult mosquitoes was investigated by confining adults, of the species mentioned, in cages containing bowls of water treated with larvicide (5 per cent. DDT in kerosene, etc., at 200 mgm. DDT per sq. yd.). It was found that eighteen hours later, there was a significantly higher mortality in the cages with treated bowls than in controls, especially among the ovipositing females. Nevertheless, the difference was not very great and there was a rather high mortality in the untreated cages. The toxic effect was greatest with a heavy persistent oil-film and such a film had a deterrent effect on egg-laying.

A sixty-minute exposure in a cage with three wooden sides treated five months before with 200 mgm. DDT per sq. ft., killed 22 per cent. adults immediately and 100 per cent. within three hours. A five-minute exposure did not kill any immediately, but 17 per cent. were dead within three hours and 73 per cent. at twelve hours. These results were more favourable than those reported by KNIPLING [this *Bulletin*, 1946, v. 43, 493] for *A. quadrimaculatus.*

Anopheles adults in DDT-treated cages display pronounced restlessness. [See KENNEDY, this *Bulletin*, 1947, v. 44, 561.] *J. R. Busvine.*

TRYPANOSOMIASIS.

LAUNOY, L. & LAGODSKY, H. Documents sur les activités trypanocides curative et préventive de la diamidino-diphénoxypentane dans quelques trypanosomoses expérimentales du rat. [**The Curative and Protective Action of Pentamidine in different Trypanosome Infections in the Rat.**] *C. R. Soc. Biol.* 1946, Dec., v. 140, Nos. 23/24, 950–52.

The authors refer to the earliest publications on the curative and prophylactic properties of diamidinodiphenoxypentane (pentamidine, M. & B. 800) in experimental trypanosomiasis [this *Bulletin*, 1940, v. 37, 404 ; *Bull. Soc. Path. Exot.*, 1940, v. 33, 310 ; this *Bulletin*, 1944, v. 41, 928, 929 ; 1946, v. 43, 314, 1025]. They then give further details of some of their own findings.

A subcutaneous dose of 30 mgm. per 100 gm. body weight is regarded as the toxic dose (*Dt*) for rats. A dose of 2 or 3 mgm./100 gm. protected rats against the "Pasteur Institute" or the "London" strain of *T. brucei* for 30 days ; 5 mgm protected against the former strain for 100 days ; 10 mgm. protected against the "London" strain of *T. equiperdum* for 90 days ; and 25 mgm. protected against the "Pasteur Institute" strain of *T. evansi* for 30 days. There is a clear correlation, as might be expected, between size of dose and duration of protection-period. Thus, a dose of 0·25 mgm. protected against *T. brucei* for only 7 to 11 days, 5 mgm for 90 to 100 days, and intermediate doses for correspondingly intermediate periods.

The ratios of curative dose to toxic dose (*Dc*/*Dt*) in different infections in rats were as follows :—"Pasteur Institute" *T. brucei* infections, 1/60 ; "London" *T. brucei*, 1/33 ; "London" *T. equiperdum*, 1/30 ; "Pasteur Institute" *T. evansi*, 1/2·4. *E. M. Lourie.*

FEVERS OF THE TYPHUS GROUP.

BRICEÑO ROSSI, A. L. & BRICEÑO-IRAGORRY, L. Las Rikettsiasis en Venezuela. [**Rickettsial Diseases in Venezuela.**] *XII Conferencia Sanitaria Panamericana. Cuadernos Amarillos. Publicaciones de la Comisión Organizadora. No. 11.* Caracas. 60 pp., 3 charts & 1 map. [Bibliography.]

A survey of the history, distribution and general epidemiological and diagnostic features.

GEAR, J. H. S. & MURRAY, N. L. **Typhus Fever in the Eastern Transvaal, with special reference to an Epidemic occurring in 1945.** *South African Med. J.* 1947, Apr. 12, v. 21, No. 7, 214–18.

Outbreaks of louse-borne typhus are said to occur almost every year among Africans in the high veld of the Eastern Transvaal. Control was difficult till DDT came into use, but now there is a good prospect of eradicating the disease in this and other areas of South Africa with the help of this insecticide of which already 700 tons have been produced at the factory of the Ministry of Supply, Northrand. Manufacture of the chemical was started in 1944 in response to an enquiry by the junior author, and under the sponsorship of the Department of Defence.

The authors suggest that fabrics can be more effectively treated with a 5·0 per cent. solution of DDT in kerosene, applied as a spray, than by dusting with the powder, which can to some extent be shaken off.

For the immediate detection of the nature of an outbreak, a rapid slide test was found of value : a drop of *Proteus OX19* suspension stained with methylene blue was mixed with a drop of finger blood on a slide, and simultaneously a slide test was carried out with a stained suspension of *Salm. typhi* 0901. Cases in the 2nd or 3rd week, or during convalescence, were selected for the tests.

Five strains of rickettsiae were isolated ; all of these caused scrotal reactions in guineapigs in the earlier passages, but the reactions tended to disappear after a variable number of passages, whereas murine strains gave more severe reactions which did not diminish in intensity after repeated passages.

Complement-fixation tests were positive at considerably higher titres with epidemic than with murine antigens. *John W. D. Megaw.*

PAYZIN, S. Riketsiyalarin mukavemeti hakkinda yapilan ve aşi istihsalinde tatbik edilmekte olan metodlar. [**Survival of Rickettsiae.**] *Türk Hifzissihha ve Tecrübî Biyoloji Mecmuasi* (*Rev. Turque d'Hyg. et de Biol. Exper.*). Istanbul. 1944, v. 4, 64–7, 1 fig. French summary 67–8.

The author records the following results of experiments carried out in his Typhus Vaccine laboratory :

1. Rickettsiae cultivated on chick embryo and diluted 1/10 in normal saline remained viable for one week at 40°C.
2. The same rickettsiae diluted 1/10 in a mixture of Tyrode solution and horse serum remained viable for 18 days at —10°C., but were no longer viable after 20 days at —14°C.
3. Dilutions in Tyrode solution alone gave a result almost identical with that given by normal saline.
4. The membrane of the infected embryo, triturated and solidified rapidly in ampoules with CO_2 snow, were dried *in vacuo* in the presence of P_2O_5 and sealed under H_2. These were still living after 132 days at —14°C. When similarly prepared, but without the H_2, the same material could not be cultivated after 14 days. *H. J. O'D. Burke-Gaffney.*

GIROUD, P. & CIACCIO, G. Essais d'inoculation de *Rickettsia Prowazeki* chez les insectes. Conservation de la virulence pour le cobaye après passage par chrysalides de *Bombyx mori* et chenilles de *Tenebrio molitor*. [**Experiments in Inoculation of Insects with** *Rickettsia prowazeki*. **The Maintenance of Virulence against Guineapigs after Passage through the Chrysalis of** *Bombyx mori* **and the Larva of** *Tenebrio molitor*.] *C. R. Soc. Biol.* 1947, Jan., v. 141, Nos. 1/2, 17–19.

BOL. OFICINA SANITARIA PANAMERICANA. 1946, Dec., v. 25, No. 12, 1075–8. English summary. Antigeno X-19 para el diagnóstico del tifo exantemático. [**X-19 Antigen for the Diagnosis of Typhus Fever.**]

At the first Inter-American Typhus Meeting, held in Mexico in October 1945, the Pan-American Typhus Commission recommended the use of Castañeda's blue X-19 antigen [see this *Bulletin*, 1941, v. 38, 448] in a preliminary test for the diagnosis of typhus. The serum should be sent thereafter to special laboratories for differential complement fixation tests, in which murine and " classical " rickettsial suspensions are used.

Uniform X-19 antigens require to be made at present in the Typhus Laboratory of Mexico.

Details are given of the preparation and standardization of the antigen, and of the rapid bedside test. *H. J. O'D. Burke-Gaffney.*

GIROUD, P. La conservation des virus typhiques exanthématiques: les maladies inapparentes, les maladies latentes. [**The Maintenance of the Typhus Infections. Inapparent and Latent Attacks.**] *Bull. Soc. Path. Exot.* 1946, v. 39, Nos. 11/12, 407–14. [13 refs.]

This paper deals with the carry-over of infection by sub-clinical and latent forms of typhus fever.

The author briefly marshalls the evidence pointing to the occurrence of sub-clinical infections; he regards the Weil-Felix test as fallacious in being negative in some cases of actual infection and positive in some cases in which the disease does not exist; in fact, he regards the reaction as being either secondary to Proteus infection or a para-agglutination due to the presence of a carbohydrate antigen common to the rickettsiae and *Proteus OX19*. The rickettsia-agglutination reaction is considered more reliable and to be a truly specific test.

The author mentions that the Weil-Felix reaction was positive in 9 of 18 uninfected pregnant women at a titre of 1–100, whereas "it does not appear that in normal persons so high titres can be observed" and he states that none of these sera agglutinated rickettsial suspensions. [For other work on the Weil-Felix test in pregnancy (not quoted by Giroud), see GRATCH, this *Bulletin*, 1944, v. 41, 197; and NELSON and CRUICKSHANK, *ibid.*, 1945, v. 42, 363.]

Examples are given of the isolation of rickettsiae from apparently healthy persons, and the conclusion is reached that the rôle of inapparent infections has been established. *John W. D. Megaw.*

LACHNIT, V. Beobachtungen an 244 Fleckfieberfällen. [**A Study of 244 Cases of Typhus Fever.**] *Wien. med. Woch.* 1947, May 10, v. 97, Nos. 18/19, 217–21. [21 refs.]

This paper consists of a good general description of the clinical features of 244 cases of typhus fever studied in a war hospital in middle Europe between late February and early May, 1943. No attempt is made to give a statistical analysis of the incidence of the signs and symptoms observed by the author.

The incubation period averaged two to three weeks and was never less than 12 days in the cases in which it could be determined. There were 20 deaths. The liver was enlarged in nearly every case; often greatly so. Petechiae were uncommon; they occurred mostly in the severest cases. On admission the leucocyte count was 4,000 to 7,000 per cmm., and there was a pronounced deviation to the left. Later there was moderate leucocytosis—9,000 to 16,000; high-grade leucocytosis occurred only in the presence of complications.

In about 55 per cent. of the cases there was a nephritic type of urinary sediment, with various types of casts and red blood cells. The diazo reaction was usually positive.

Strophanthin and glucose were given to all the patients as soon as they were admitted. Large doses of calcium gluconate were also given.

John W. D. Megaw.

GIROUD, P. Pouvoir antigène comparé de suspensions de rickettsies purifiées ou non par agitation avec un liquide non miscible. [**Comparison of the Antigenic Potency of Crude Rickettsial Suspensions with Suspensions Purified by shaking with a Liquid not Miscible with Water.**] *C. R. Soc. Biol.* 1946, Jan., v. 140, Nos. 1/2, 32–4.

BRUMPT, L. C. La prophylaxie du typhus pendant le rapatriement. [**The Prevention of Typhus during Repatriation.**] *Bull. Internat. Services de Santé des Armées.* Liège. 1947, Mar., v. 20, No. 3, 83–9.

NELSON, C. T. **The Serologic Response in Murine Typhus as measured by the Weil-Felix, Rickettsial Complement Fixation, and Rickettsial Agglutination Reactions.** *J. Lab. & Clin. Med.* 1947, Apr., v. 32, No. 4, 360–66, 1 fig. [26 refs.]

Weil-Felix, rickettsia-agglutination, and complement-fixation tests were carried out at frequent intervals on sera from 22 murine-typhus patients. With the technical methods employed, which are fully described, the author found that the titres obtained with the first two tests rose earlier and more steeply than with the complement-fixation test, which remained negative in nearly one-third of the cases three weeks after the onset, whereas the agglutination tests were always positive by that time.

The rickettsia-agglutination test was carried out by the slide technique described by FITZPATRICK [see this *Bulletin*, 1945, v. 42, 982]; the antigens used kept well for at least six months at refrigerator temperature. The test is said to be superior to the Weil-Felix reaction in being more specific and in permitting the same degree of differentiation between murine typhus, classical typhus, and Rocky Mountain spotted fever, as is obtainable with the complement-fixation test.

Three cases of Rocky Mountain spotted fever were studied; in none of these was there any cross-agglutination when the murine antigen was employed; this result is opposed to the finding of PLOTZ, who found that sera from 13 patients suffering from Rocky Mountain spotted fever agglutinated murine and classic rickettsiae [see this *Bulletin*, 1945, v. 42, 636].

[It is to be hoped that the Fitzpatrick technique will be tested on a large scale and that the results already obtained will be confirmed.]

John W. D. Megaw.

DAVIS, D. E. **The Use of DDT to control Murine Typhus Fever in San Antonio, Texas.** *Pub. Health Rep.* Wash. 1947, Mar. 28, v. 62, No. 13, 449–63, 2 folding maps.

The author describes a large-scale experiment designed to test the efficacy of applications of a 10 per cent. DDT dust to the haunts of rats as a method of controlling murine typhus by the destruction of rat fleas.

The results obtained are described as encouraging, but their significance is not easy to assess in view of the following statements :—" The flea indices of these rats are a measure of the efficiency of the crew; they are not a measure of the efficiency of DDT" and " From our experience we have become satisfied that when DDT is thoroughly and carefully put out the number of fleas can be reduced almost to zero."

In the experiment the average quantity of DDT powder used for each room was about four ounces, but the reduction in the flea indices was disappointingly small.

The paper will be of special interest to workers who contemplate the use of DDT as a method of rat-flea control. *John W. D. Megaw.*

MILLSPAUGH, D. D. & FULLER, H. S. **The Occurrence of *Trombicula deliensis* Walch in Southwestern China.** *Amer. J. Hyg.* 1947, Mar., v. 45, No. 2, 204–5.

Although scattered cases of scrub typhus occurred amongst American troops in China, and the presence of the disease there has long been suspected, its

occurrence has apparently not been clearly demonstrated: only 5 cases were reported by the National Health Administration of China between 1940 and 1945, and these were in Kweiyang and Kunming.

In August 1945, the authors, working from the China-Burma-India Field Headquarters, U.S.A. Typhus Commission, collected a considerable number of mammals and birds and their ectoparasites near Kunming (Yunnan Province) and Kweiyang (Kweichow Province). No attempts to recover rickettsiae by animal inoculation were made. In an area 15 miles south-west of Kunming, at an altitude of 6,000 feet, specimens of *Trombicula deliensis* Walch were identified from an insectivora, 3 genera of rodents and a bird. This wide choice of hosts accepted by the mite confirms the observations of MACKIE *et al.* in Burma and Assam [this *Bulletin*, 1946, v. 43, 917].

The hosts concerned were the Chinese tree shrew (*Tupaia belangeri chinensis* Anderson); Vole (*Eothenomys miletus miletus*); Sulphur-bellied rat (*Rattus confucianus confucianus*); Tree squirrel (*Dremomys pernyi flavior* Allen); and White-cheeked laughing thrush (*Dryonastes sannio*).

These are claimed to represent new host species and localities for *T. deliensis*, and it is also stated that this is the first record from China of this mite.

The authors point out the strong suspicion that *T. deliensis* may play a rôle in the transmission of scrub typhus in south-west China.

H. J. O'D. Burke-Gaffney.

MCLIMANS, W. F. & GRANT, C. W. **Therapy of Experimental Tsutsugamushi Disease (Scrub Typhus).** *Science.* 1947, Feb. 14, 181–2, 2 figs.

By a series of rigidly controlled experiments, the authors have shown that methylene blue, mixed with the food in a concentration of 0·2 per cent. is strikingly effective in controlling infection caused among Swiss mice by intraperitoneal injections of virulent *Rickettsia tsutsugamushi*.

The treatment, when started 96 hours after inoculation, reduced fatality rate from 90–100 per cent. to 30–40 per cent.; and when oxygen was given in addition, in an oxygen tent, the rate was further reduced to 20–30 per cent.

PABA (para-aminobenzoic acid) given in the same way, at strengths of 0·4 to 1·9 per cent., was less effective, and it ceased to have a demonstrable action when administration was started 120 hours after inoculation, whereas methylene blue plus oxygen still had some effect when started 192 hours after inoculation.

John W. D. Megaw.

WALKER, W. T. **Scrub Typhus Vaccine. Its Effect on Sixteen Cases incubating the Disease.** *Brit. Med. J.* 1947, Apr. 12, 484–7, 4 figs.

The author reports that scrub-typhus vaccine prepared in "Operation Tyburn", at Frant in Sussex, appeared to have produced a favourable effect on 16 men who had received one or more doses a short time before the onset of attacks of scrub typhus [see this *Bulletin*, 1946, v. 43, 435 and 436].

Among one group of seven patients who had received only one dose less than three days before the onset, the average duration of the fever was 21·5 days, but the patients are said to have been remarkably free from toxic symptoms, though two are reported as having had circulatory collapse.

Five patients had received only one dose three or more days before the onset; in these the average duration of the fever was 14·5 days, and all were "moderately toxic".

Two patients had received two doses each at a week's interval, the second just before the onset; neither "was really ill".

Two patients had received the full course of three doses, the last just before the onset; neither patient felt at all ill; the duration of the fever was nine days in one and ten days in the other. *John W. D. Megaw.*

CARD, W. I. & WALKER, J. M. **Scrub-Typhus Vaccine: Field Trial in South-East Asia.** *Lancet.* 1947, Apr. 12, 481–3, 1 fig.

The authors have analysed the salient features observed in attacks of scrub typhus which occurred in 33 men to whom the "Operation-Tyburn" vaccine had been administered.

In seven of the patients, a full course of three doses had been given, but there was no indication of any pronounced effect on the duration or severity of the disease.

There was no death among the 33 patients who had received one or more doses of the vaccine, but the fatality rate among the unvaccinated troops during the same period was only 30 per cent. so the author rightly concludes that the findings have no statistical significance.

[From this and the preceding abstract it appears that the efficacy of the vaccine has not yet been proved, but the scanty evidence available does not exclude the possibility that a full course may lessen the severity of subsequent attacks.] *John W. D. Megaw.*

GREENBERG, M., PELLITTERI, O., KLEIN, I. F. & HUEBNER, R. J. **Rickettsialpox—a Newly Recognized Rickettsial Disease. II. Clinical Observations.** *J. Amer. Med. Ass.* 1947, Mar. 29, v. 133, No. 13, 901–6, 7 figs.

The authors describe the clinical features of 144 cases of this newly recognized rickettsial disease [see this *Bulletin*, 1947, v. 44, 411].

The initial lesion appeared, on the average, about seven days before the onset of the fever, first as a small rounded papule in the centre of which a vesicle was gradually formed, and eventually there was a firm black eschar. The lesion persisted about three weeks, leaving a scar; it was seen in 95 per cent. of the patients who were under constant observation.

The onset of the fever was sudden, with chills, sweating, and pain in the back. The temperature rose rapidly to 103–104°F.; the fever was remittent, lasted 1–10 days, and ended by lysis.

A rash was seen in all the cases. It first appeared on the day of the onset or on one of the four following days; it lasted 4–7 days in most of the cases. The lesions at first were erythematous and maculopapular; they soon became vesicular in the centre, and, on drying up, dark crusts were formed; there was no scarring. The number and distribution of the spots were very variable. All the patients recovered without complications.

Moderate leucopenia was usual. Negative results were obtained with blood cultures. Agglutination tests with *Proteus*, typhoid-group, and several other organisms, were negative. Positive complement-fixation reactions were obtained with an antigen prepared from a rickettsia isolated from a patient by mouse inoculation; with the use of this antigen, negative reactions were obtained with sera from patients suffering from murine typhus, scrub typhus, and Q fever, but positive reactions occurred in 80 per cent. of sera from Rocky Mountain spotted fever patients, though at lower titres than those observed in rickettsialpox sera. *John W. D. Megaw.*

VALLEJO-FREIRE, A. **Spotted Fever in Mexico. Immunological Relationship between the Virus of the Rickettsiosis observed in Sonora and Sinaloa, Mexico, and other Spotted Fever Viruses.** *Mem. Inst. Butantan.* 1946, July, v. 19, 159–79. [25 refs.]

The author describes the results obtained in a study of a strain of rickettsia isolated in Mexico by BUSTAMANTE and VARELA from a patient whose disease was diagnosed as "Rocky Mountain spotted fever in Sonora and Sinaloa, Mexico." The diagnosis was made on clinical grounds and on the finding by R. R. PARKER that the rickettsia could not be differentiated from virulent strains of the organisms of Rocky Mountain spotted fever. [See this *Bulletin*, 1945, v. 42, 203, and 1946, v. 43, 1134.]

The author found complete cross protection among guineapigs surviving from inoculation with the Mexican and São Paulo strains of rickettsiae.

Rocky Mountain spotted fever vaccine of the Cox type protected guineapigs against infection with both the above strains.

Rabbits inoculated with both strains gave similar responses to the Weil-Felix test, *viz.* rising-titre reactions with *Proteus OX19*, *OX2*, and *OXL*, and negative reactions with *OXK*.

Some of the rabbits, before inoculation, gave high-titre responses with *OXK*, but the titres fell or remained constant during the illness.

The name "spotted fever" is suggested as being most suitable for the tick-borne typhus-like fevers of North and South America.

[But the name spotted fever, when used without qualification, has been applied to cerebrospinal meningitis and to other forms of typhus; the classical name Rocky Mountain spotted fever is not open to this objection but is obviously unsuitable for a disease with a very wide distribution. The name tick typhus is descriptive and pending a final judgment on the relationship between the tick-borne fevers of the typhus group the present disease might well be designated as tick typhus of the Rocky Mountain type.] *John W. D. Megaw.*

RAVENEL, S. F. **Para-Aminobenzoic Acid Therapy of Rocky Mountain Spotted Fever. Outline of a Comprehensive Plan of Treatment with Report of Five Cases.** *J. Amer. Med. Ass.* 1947, Apr. 5, v. 133, No. 14, 989–94, 8 charts. [Refs. in footnotes.]

The author treated five cases of Rocky Mountain spotted fever with para-aminobenzoic acid (PABA); associated with systematic supportive treatment. The results suggested that this line of treatment may practically eliminate deaths from "this fearful disease".

The ages of the patients were :—17, 10 3, 4, and 5 years.

The youngest children were given 2·0 gm. per kilo body weight daily, in two-hourly doses; older children were given half this amount. With each gm. of the drug 10·0 cc. of 5·0 per cent. sodium bicarbonate was given.

Possible toxic effects are said to be :—acidosis, leucopenia, abdominal distension, and delirium.

Details are given of the supportive and other ancillary lines of treatment. Intravenous injections of dextrose in saline, sodium-lactate solution, plasma, and blood, were given without hesitation when their use was regarded as being indicated. The combined treatment necessitated the adoption of "adequate laboratory studies."

No death occurred, and decided curative action was observed in every case.

John W. D. Megaw.

See also p. 758, HUMPHREYS & CAMPBELL. **Plague, Rocky Mountain Spotted Fever, and Tularaemia Surveys in Canada.**

BLANC, G., MARTIN, L. A. & MAURICE, A. Présence du virus de la " Q Fever " dans le Maroc méridional. [**The Occurrence of *Rickettsia burneti* in South Morocco.**] *Bull. Acad. Nat. Méd.* 1947, v. 131, Nos. 7/8, 138–43, 2 figs. [Refs. in footnotes.]

From ticks identified as *Hyalomma savignyi* the authors have isolated three strains of *Rickettsia burneti*. Suspensions of the infected ticks or of yolk-sac cultures caused reactions in guineapigs similar to those caused by strains of American Q fever, and there was complete cross immunity between the American and Moroccan strains, but none between the Moroccan strain and the rickettsiae of typhus fever, boutonneuse fever, " spotted fever " and " river fever ".

The authors state that *Hyalomma*, *Rhipicephalus sanguineus*, and *Ornithodorus erraticus* can readily be infected in the laboratory.

A brief account is given of the experimental investigation of the strains.

The paper includes a concise summary of the literature of Q fever and a useful bibliography. [The authors quote DELPY (*Arch. Inst. d'Hessarek*, 1946, v. 2, 90) who describes *H. Savignyi* (Gervais) as " often identified by the name *H. aegyptium* ".] *John W. D. Megaw.*

HUEBNER, R. J. **Report of an Outbreak of Q Fever at the National Institute of Health. II. Epidemiological Features.** *Amer. J. Pub. Health.* 1947, Apr., v. 37, No. 4, 431–40, 5 figs. [12 refs.]

Between December 17th, 1945, and May 30th, 1946, an outbreak of 47 cases of Q fever occurred in an isolated laboratory building, which was one of eight separate buildings of the National Institute of Health, Bethesda, Maryland. Work on Q fever had been carried on almost continuously at the Institute since June 1938.

All the cases occurred among persons who had been in the building at some time during the four weeks preceding the onset of their attacks.

The total number of persons who had been in the building during the period was 197, of whom 142 were workers and 55 were visitors. All these persons were studied, and so also were 43 contacts of Q fever patients and 77 workers at the Institute who had never entered the affected building ; no cases occurred among the latter two groups.

Among the 142 workers in the building, 59 had been present during an outbreak of the disease in 1940 [see this *Bulletin*, 1941, v. 38, 446, 691] ; all the 14 of these who were known to have had attacks in 1940 escaped the disease, and among the remaining 45 only 8 were attacked, whereas among the 82 who had not been present in 1940 there were 36 cases.

Among 20 workers in the building who had been protected against Rocky Mountain spotted fever by a vaccine, only 5 were attacked, and among 62 who had not been thus protected, 31 were attacked. This difference in the incidence suggested that the vaccine may have conferred some degree of immunity. Vaccination against typhus did not lessen the susceptibility to Q fever.

Among the 55 visitors to the building, 3 were attacked ; the incubation periods were 14–16, 17–22, and 28 days respectively. Other evidence suggested that the usual incubation period was 13–18 days.

Workers in all the five floors of the building were attacked, and, strangely enough, the incidence was not highest among the persons most closely connected with work on the disease, but these, with one exception, had been repeatedly vaccinated against Rocky Mountain spotted fever.

The outbreak started shortly after six strains of Q-fever rickettsiae came under investigation involving yolk-sac culture and guineapig inoculation. Both in the present and the 1940 outbreak there was a striking degree of association

with the preparation of a yolk-sac antigen, by a process involving high-speed centrifugation of suspensions treated with 0·5 per cent. formalin. A significant point was that this strength of formalin has not been found lethal to Q-fever rickettsiae.

Among 30 guineapigs kept on one floor of the building, 15 were found to have been infected, and among 30 on another floor, 5 were infected; none of the 132 guineapigs distributed through the other three floors was infected. Attempts to infect guineapigs by keeping them in the same cages as infected guineapigs are said to have failed.

[No conclusion is stated with regard to the manner of transmission of infection, but it is difficult to reconcile the findings in this and other laboratory outbreaks of the disease with any other hypothesis than the inhalation of droplets of infected yolk sac material discharged into the air in the course of processing. The outbreak at Fort Bragg Laboratory, for example, seems to have been associated with this type of transmission (see this *Bulletin*, 1947, v. 44, 69).]

John W. D. Megaw.

TOPPING, N. H.; SHEPARD, C. C.; IRONS, J. V.; HOOPER, J. M.; MURPHY, J. N.; WOLFE, D. M.; COX, H. R.; TESAR, W. C. **Q Fever in the United States. I.—Epidemiologic Studies of an Outbreak among Stock Handlers and Slaughterhouse Workers** [TOPPING, SHEPARD & IRONS]. *J. Amer. Med. Ass.* 1947, Mar. 22, v. 133, No. 12, 813–15. **II.—Clinical Data on an Outbreak among Stock Handlers and Slaughterhouse Workers** [IRONS & HOOPER]. *Ibid.* 815–18, 5 figs. **III.—Serologic Observations in an Outbreak among Stock Handlers and Slaughterhouse Workers** [IRONS, MURPHY & WOLFE]. *Ibid.* 819–20. **IV.—Isolation and Identification of Rickettsias in an Outbreak among Stock Handlers and Slaughterhouse Workers** [COX, TESAR & IRONS]. *Ibid.* 820–21. [Refs. in footnotes.]

In these four papers, different aspects of an explosive outbreak of Q fever are described. Altogether, 55 cases occurred in March 1946, among 136 persons more or less closely associated with the handling of cattle in Amarillo, Texas. There were two deaths.

I. The first paper deals with a careful epidemiological study, from which it appears that the source of infection was a group of 41 apparently healthy cattle that arrived at a stock-yard on February 23rd. The first case occurred on March 10th, and the others followed in quick succession during the next four days. There was no evidence of transmission by ticks, and it was thought that infection may have been by dust [presumably by inhalation] derived from material contaminated by the excreta of the infected cattle.

II. The second paper contains clinical data, based chiefly on the observation of 18 patients treated in hospital. The clinical picture was extremely varied, ranging from sub-clinical attacks and mild influenza-like illnesses to fatal attacks, of which there were two.

The onset was usually rapid, with headache, chills, and malaise. The duration of the fever in hospital cases ranged from 7 to 19 days, except in one case in which it was 43 days. Neuralgic pains in the chest occurred in more than half the cases; cough, usually non-productive, was not infrequent: otherwise there was little evidence of pulmonary involvement, apart from X-ray findings, which usually revealed the presence of lesions such as occur in atypical pneumonia, pneumonitis, or early pneumonia.

Leucocyte counts, various agglutination tests, and blood cultures, gave negative results. Convalescent sera of patients gave complement-fixation and rickettsia-agglutination reactions against Q-fever antigens. Convalescence was

usually uneventful, but in three cases it was prolonged by pleural effusion. Autopsies were not performed in the two fatal cases.

No definite rash was seen in any of the cases.

III. The third paper deals with the serological findings, especially the complement-fixation tests. With Q-fever antigens, rising-titre fixation occurred; the average maximum titre, reached about the 4th or 5th week, was 1–320.

IV. In the fourth paper an account is given of the isolation of *Rickettsia burneti* from the sera of two patients. DBA (dilute brown agouti) mice were inoculated with 0·5 cc. of a 1–10 dilution of the patient's serum; no evidence of infection was observed after the original intraperitoneal inoculation, but 10 per cent. suspensions of the spleens of these mice, killed seven days after inoculation, were used for transfers, and strains of the organism were isolated from the enlarged spleens of mice of the second and third passages.

Yolk-sac cultures were readily obtained. Passages through albino Swiss mice and guineapigs were also successful. *John W. D. Megaw.*

DENGUE AND ALLIED FEVERS.

FLEMING, J., BIGNALL, J. R. & BLADES, A. N. **Sand-Fly Fever. Review of 664 Cases.** *Lancet.* 1947, Apr. 5, 443–5. [11 refs.]

In Rome and Naples during 1944 and 1945, the authors have studied 664 cases of fever which "satisfied the rather ill-defined criteria for the diagnosis of sand-fly fever."

The cases conformed to the usual clinical pattern of the disease, but during the outbreaks, especially those in Naples, *Phlebotomus papatasi* were scanty, whereas other biting insects—culicine mosquitoes and *Stomoxys calcitrans*—were much more plentiful.

The blood findings were not found helpful in differentiating the disease from other virus infections such as atypical pneumonia and the pre-icteric stage of infective hepatitis. There was stiffness of the neck in 121 cases, vomiting in 116, photophobia in 55, and chest pain resembling pleurodynia in 7.

A rash was seen in 95 cases on the first day of the illness; this is described as:—"macular, 30; urticarial, 5; petechial, 20; and herpes labialis, 40." Secondary fever was never observed. *John W. D. Megaw.*

ANDERSON, W. M. E. **Sand-Fly Fever.** [Correspondence.] *Lancet.* 1947, May 3, 613.

The author sharply criticizes the suggestion of FLEMING *et al.* [above] that any blood-sucking insect may act as a vector of sandfly fever; on the evidence offered he regards this hypothesis as unsubstantiated.

He also finds the observations on symptomatology as unsatisfying, and refers to his own paper in which the diagnosis was confirmed by SHORTT, who cultured the virus on egg membrane [see this *Bulletin*, 1942, v. 39, 155].

John W. D. Megaw.

FLORIO, L. & STEWART, Mabel O. **Colorado Tick Fever.** *Amer. J. Pub. Health.* 1947, Mar., v. 37, No. 3, 293–7, 3 figs. [12 refs.]

A general description—see this *Bulletin*, 1945, v. 42, 118–19.

DE BOER, C. J., KUNZ, L. J., KOPROWSKI, H. & COX, H. R. **Specific Complement-Fixing Diagnostic Antigens for Colorado Tick Fever.** *Proc. Soc. Exper. Biol. & Med.* 1947, Feb., v. 64, No. 2, 202–8. [14 refs.]

Colorado tick fever is now recognized as a virus disease, presumably tick-borne, quite distinct from Rocky Mountain spotted fever and dengue, though resembling the latter disease both clinically and haematologically [also in being caused by a filter-passing virus].

Antigens for the complement-fixation tests were prepared from the brains of 21-days-old Swiss albino mice inoculated intracerebrally with three strains of infectious mouse-brain suspensions. Two of the strains had been passed repeatedly through the brains of hamsters and mice, the third had been passed through the brain of a dba (dilute brown agouti) mouse and then through the brains of 10 Swiss albino mice.

Immune serum was obtained from hyperimmunized mice, and several samples of human sera were obtained from patients.

Details of the technique and references to previous work on the disease will be found in the paper.

With the antigen, mouse-immune serum gave complete fixation at a titre of 1–30 ; the same serum gave completely negative responses with other virus antigens, including various strains of equine encephalomyelitis, and also with rickettsial antigens, including murine typhus, Rocky Mountain spotted fever, and American Q fever, though all these antigens reacted well with their homologous sera.

With human sera from Colorado tick fever patients, complement-fixation and mouse-neutralization tests gave positive results, in one case as early as the 9th day, in another as late as 34 months after recovery.

With human syphilitic sera, the antigens yielded no false positives.

John W. D. Megaw.

PLAGUE.

PUBLIC HEALTH REP. Wash. 1947, Mar. 21, v. 62, No. 12, 431–3. **Plague Infection reported in the United States in 1945.**

Sampling surveys of infection in rodents and ectoparasites. No human case was reported during 1945.

BAKER, E. E., SOMMER, H., FOSTER, L. E., MEYER, E. & MEYER, K. F. **Antigenic Structure of *Pasteurella pestis* and the Isolation of a Crystalline Antigen.** *Proc. Soc. Exper. Biol. & Med.* 1947, Feb., v. 64, No. 2, 139–41.

This is a very condensed note and is therefore difficult to summarize, but the subject matter is to be dealt with in full detail later. Dried bacilli of the " Yreka " strain were grown for 3 days on agar at 37°C., when the growth was suspended in normal salt solution, precipitated and repeatedly washed with acetone to give a dried powder of which the LD_{50} for 20-gm. mice was 20–40μgm. This powder, extracted with neutral salt solutions, yielded a water-soluble and a water-insoluble antigenic component. The former contains three antigens, fractions I (A and B) and II. Antigenic fraction I (IA and IB) is formed by all virulent strains and one avirulent strain, 1122, which gives a stable suspension in normal salt solution at 37°C. It is surmised that IB, a carbohydrate-free crystalline protein, may be an artefact and that IA, the carbohydrate protein fraction, is the normal antigen of the intact cell. Both IA

and IB are " envelope " antigens. The author considers that " in view of the observed differences in response of the various laboratory animals to the different antigens of plague bacilli, it is advisable at the present time to use vaccines containing all of the antigens of *P. pestis* for prophylaxis of plague in man and for the production of antiplague serum." *W. F. Harvey.*

HERBERT, D. **Streptomycin in Experimental Plague.** *Lancet.* 1947, May 10, 626–30, 3 figs. [39 refs.]

Streptomycin, as the possible rival to sulphonamides and penicillin, is receiving much experimental attention. The results here given, even with a disclaimer that they are not optimal, are very detailed. It would appear that, *in vitro*, streptomycin is not merely bacteriostatic, but bactericidal ; acts on Gram-positive, Gram-negative and acid-fast organisms ; is comparatively non-toxic to animals and man and, having proved effective in tularaemia, is also found to be effective in experimental plague. It would seem, moreover, that *Past. pestis* is more sensitive to all three test substances, sulphanilamide, sulphathiazole and penicillin, than most Gram-negative organisms are reported to be. The two highly plague-susceptible animals, mice and guineapigs, and both virulent and avirulent (Tjiwidej) strains were used in these experiments. A sufficient dosage was employed to kill 100 per cent. of the control animals.

This important work is summarized :—Streptomycin in concentrations of 3 units/ml. brings about rapid sterilization of plague cultures. In mice infected subcutaneously with a highly virulent strain . . . 2½-day courses (800 units/day) started 0, 24 and 48 hours after infection gave 85 per cent., 60 per cent. and 5 per cent. survival. . . . In guineapigs, 3½-day courses (40,000 units/kgm./day) gave 100 per cent. survival even when dosage was delayed for 48 hours after infection. " Streptomycin is equally effective in the treatment of artificially induced pneumonic plague in both mice and guineapigs. . . . In comparative tests in infected mice, however, streptomycin was considerably more effective than sulphathiazole, and penicillin was only slightly effective, even in very high dosage." Treatment begun at 0 hours may be regarded as semi-prophylactic, and treatment 72 hours after infection gave no survivals and was, therefore, ineffective, " though survival was significantly prolonged." *W. F. Harvey.*

MACCHIAVELLO, A., MOSTAJO, B. & MOSTAJO, B., Jr. Control de una epidemia de peste bubónica con DDT y " 1080". [**Plague Control in Peru with DDT and " 1080".**] *Bol. Oficina Sanitaria Panamericana.* 1946, Dec., v. 25, No. 12, 1097–1100. English summary.

In 1945, an epidemic of plague occurred in the city of Tumbes, Peru, which has 10,000 inhabitants. Forty cases occurred, with 14 deaths.

There were 21 foci, in which 27·3 per cent. of the rats found, and 56 per cent. of their fleas, were infected with plague.

DDT powder (diluted to 10 per cent. in talc or pyrophyllite and 2–5 per cent. in refined wheat flour) was applied to floors, walls and ceilings. Sodium fluoracetate (1080) was then applied.

The epidemic ended 4 days after the first application of DDT was completed : fleas, on rats or in their nests, were reduced by about 85 per cent., and fleas throughout the foci were finally reduced by over 90 per cent.

Plague in the rats was reduced by 75·6 per cent. after the first application of DDT and was eradicated completely after the second.

The use of 1080 was most effective: for example, in one part of the city, 40·4 rats per 100 baits were killed, as were 1·2 rats per house.

H. J. O'D. Burke-Gaffney.

See also p. 758, HUMPHREYS & CAMPBELL. **Plague, Rocky Mountain Spotted Fever, and Tularaemia Surveys in Canada.**

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS.

ALBRIGHT, E. C. & GORDON, E. S. **Present Status of the Problem of Amebiasis.** *Arch. Intern. Med.* 1947, Mar., v. 79, No. 3, 253–71. [Refs. in footnotes.]

A review of the epidemiology, pathology, diagnosis and treatment.

MURRAY-LYON, R. M. **The Aetiology and Diagnosis of Amoebiasis.** *Edinburgh Med. J.* 1947, Feb., v. 54, No. 2, 65–75. [24 refs.]

CAMERON, J. D. S. **Amoebiasis.** *Ibid.* 76–89, 6 figs. on 1 pl. & 4 text figs. [20 refs.]

Useful summaries for the medical practitioner.

GREIF, R. L. **Agglutination of** *Endamoeba histolytica* **Cysts.** *Amer. J. Trop. Med.* 1947, Mar., v. 27, No. 2, 131–4, 2 figs.

The author cites a number of workers, including HEATHMAN [this *Bulletin*, 1933, v. 30, 25] who have used the agglutinin reaction in the study of free-living amoebae.

In the present study, an attempt was made to find agglutinins for cultured cysts of *E. histolytica* in the sera of carriers.

Cyst suspensions were made from the NRS strain of *E. histolytica* grown on coagulated egg medium; the technique of preparing the suspensions is described.

Inactivated sera from persons suspected of being infected with *E. histolytica* were tested against the cyst suspensions; so also were fresh sera, picked at random, and a number of biological products, including normal horse serum. For testing, 0·02 cc. of cyst suspension and 0·02 cc. of serum were mixed on a well slide; the slide was placed on moist filter paper in a Petri dish, and incubated for ½–2 hours at 37°C., with gentle agitation every 15 minutes. Saline and positive sera controls were included. Before microscopic examination, the slide was shaken vigorously.

Agglutination was marked in 2 hours, and more marked after 8 to 10 hours standing at 4°C. The clumping of the cysts is shown in two photomicrographs.

The results are shown in a table: agglutinins were obtained in dilutions of serum from man and horse; there appeared to be no correlation between agglutination and infection with *E. histolytica* nor was the agglutination related to complement fixation.

There was an indication that the agglutinins are contained in the gamma globulin fraction, since 1/400 dilutions of the concentrated fraction agglutinated the cysts, when the slides were kept at 4°C. for eight hours after incubation.

A plea is made for further investigation of the problem.

H. J. O'D. Burke-Gaffney.

CARRAUD, G. Comment peut se poser le diagnostic de l'amibiase intestinale ? [**The Problem of diagnosing Intestinal Amoebiasis.**] *Schweiz. med. Woch.* 1947, May 10, v. 77, No. 19, 532–3.

An account of 3 atypical cases, with observations on diagnosis.

ROSENSTIEL. Considérations sur l'amibiase chronique et son traitement. [**Chronic Amoebiasis and its Treatment.**] *J. Méd. de Bordeaux.* 1947, Apr., v. 124, No. 4, 159–61.

A discussion on diagnosis and treatment.

PADRON IBARBIA, F. Granuloma inflamatorio del ciego de origen amebiano. [**Amoebic Granuloma of the Caecum.**] *Sanidad y Beneficencia Municipal.* Habana, Cuba. 1946, Jan.–Dec., v. 6, No. 1, 38–41, 2 pls.

MOHAPATRA, G. S. **Diagnosis of Presumptive Amoebic Hepatitis in a Child Aged Two Years.** *Indian Med. Gaz.* 1947, Jan., v. 82, No. 1, 24–5.

The case was diagnosed clinically and responded to emetine.

EDWARDS, M. L. **Amoebic Pericarditis.** *Med. J. Australia.* 1947, Feb. 8, v. 1, No. 6, 177–8.

The author refers to Editorial comment in the *Med. J. Australia*, of February 2nd, 1946, on the rarity of amoebic pericarditis, the comment arising out of the case diagnosed at autopsy by KERN [this *Bulletin*, 1946, v. 43, 42].

He then describes the clinical record of a patient seen by him, who had served in the Middle and the Far East. He was admitted to hospital in New Guinea on May 10th, 1945, complaining of subcostal pain on the right side, aggravated by deep breathing, and passing to the neck : the pain had been present for a week. No significant changes were noted on careful investigation, other than a hookworm infestation, which was treated.

The patient's symptoms persisted and, on May 19th, a pericardial rub was heard over the base of the heart, down to the fourth left intercostal space : this persisted until May 27th. On June 2nd, the persistent pain in the right hypochondrium began to radiate to the right shoulder. The liver was not palpable. Full clinical, laboratory and X-ray examinations were made, but were not significant.

The patient was seen by the author on the mainland on June 26th, and felt much more comfortable after 6 weeks' rest. Further full investigation revealed little of significance.

Symptoms of diaphragmatic irritation, however, gradually increased. An X-ray film of the chest on July 18th showed a localized rounded elevation of the diaphragm on the right side, just lateral to the cardio-phrenic angle. Leucocytes were now 10,000 per cmm. with 66 per cent. neutrophiles and 6 per cent. metamyelocytes.

Despite the absence of amoebae or cysts, a course of emetine was given empirically : this consisted of 1 grain of the hydrochloride intramuscularly daily for ten days, from July 20th, followed by routine E.B.I. and carbarsone. On July 23rd, the patient developed a cough with frothy, purulent, blood-stained, copious sputum : microscopic examination showed no significant elements. Signs of patchy consolidation of the right lung, with pleural friction and frequent râles now developed : this condition responded to sulphadiazine and on July 30th, symptoms had greatly diminished. On August 9th, the patient felt well and further convalescence was uneventful.

A further X-ray in the beginning of August showed elevation of the right side of the diaphragm in the middle of its leaf : there was an area of opacity in

the lung field at the base of the right lung overlying this elevation, with increased vascular markings running to the right hilum. The appearances were consistent with a rupture through the diaphragm, which had left a residual pneumonia and adherent pleura.

The author has little doubt, on clinical grounds, that the case was one of amoebic abscess of the liver, rupturing spontaneously through the diaphragm, the chief interest lying in the early persistent pericardial friction which was the only evident clinical abnormality at the time.

[A case of amoebic pericarditis, responding to emetine, was recently reported by LAHA in India, this *Bulletin*, 1947, v. 44 585]. This case, like that of Kern and of the present author was secondary to an amoebic hepatitis; in each case diagnosis was made either on the general clinical or post-mortem picture or the response to emetine or broth: in none was the causative organism found during life: the present author rightly summarizes the pericardial manifestations as "evidence of a pericardial reaction to the underlying amoebic infestation of the liver." Such a guarded description as "pericarditis associated with amoebic hepatitis" is indeed perhaps more accurate than the generalization "amoebic pericarditis". The real lesson to be learnt from these interesting records is the need to consider the possibility of amoebic infection when faced with a combination of pericarditis with pain in the right shoulder and hypochondrium, painless enlargement of the liver and radiological evidence of localized diaphragmatic elevation.] *H. J. O'D. Burke-Gaffney.*

CARINI, A. Mais um caso de amebiase cutanea implantada na ferida cirurgica da abertura de um abcesso hepatico. [**A Case of Cutaneous Amoebiasis implanted in the Surgical Wound of a Liver Abscess.**] Reprinted from *Arquivos de Biol.* 1939, Mar., v. 23, No. 214, 2 pp., 1 fig.

RAWSON, G. W. & HITCHCOCK, Dorothy J. **An** *in vitro* **Method of testing the Amoebicidal Action of Chemical Agents.** *J. Parasitology.* 1947, Feb., v. 33, No. 1, 19–24.

In testing amoebicidal drugs *in vitro*, cultures of *E. histolytica*, with a mixed bacterial flora, were exposed to serial dilutions of 52 drugs, mostly arsenicals, for a period of 24 hours at 37°C., with all the usual precautions. Comparable tests were made under slightly different conditions with another strain of the amoeba grown with a single organism. The culture medium consisted of whole egg slant with a liquid portion of liver extract in saline. The drugs were dissolved in medium similar to the liquid portion, and the *p*H was adjusted to between 7·0 and 7·5. Insoluble compounds or those whose solutions lie outside the above *p*H range are not suitable for test by this method. The drugs in solution were added in different dilutions to tubes containing *E. histolytica* cultures 48 to 72 hours old, and incubation was carried out for 24 hours. Examination was then made for the presence of motile amoebae, the highest drug dilution at which they were seen being considered as the end point. When the results were doubtful, sub-cultures were made. The tests with the two different organisms gave fairly consistent results. Stovarsol, carbarsone and chiniofon did not give results as favourable as those shown by some other compounds which have not yet been tested clinically. Further tests are therefore necessary before these qualitative results can be assessed.

[The concentrations at which some drugs proved effective are higher than those found in similar experiments by the reviewer. This may be explained partly by the fact that the drugs were allowed to act for 24 hours only, and partly because the culture medium contained a solid portion, which was shown many years ago to absorb added drug. Filtration of drug solutions through a Seitz filter, which was done in some cases, would also reduce the concentration of those having adsorptive properties.] *J. D. Fulton.*

VALDIVIA PONCE, O. Parasitismo intestinal en la provincia de Islay. [**Intestinal Parasitism in the Province of Islay.**] *Crónica Méd.* 1946, July, v. 63, No. 997, 175–9.

The high rate of infestation with intestinal parasites in the province of Islay, Peru, is, as the author states, evidence of "the wretched sanitary conditions existing there".

Some 500 stool examinations were made in 3 districts of the Province, and the results of each are shown separately. For the Province as a whole, protozoal infections predominated, the pathogenic amoebae accounting for 66 per cent. of the total number of parasites: helminths amounted to about 12 per cent., and over 8 per cent. of parasites found were *Hymenolepis nana* infections. Over 80 per cent. of the stools were positive, and all but 10 per cent. of them were in children of school-age. Protozoal infestations predominated at the Coast, and helminthic were commoner up-country. *H. J. O'D. Burke-Gaffney.*

ZEPEDA, J. E. Incidencia de los principales protozoarios intestinales en la ciudad de Tegucigalpa, D.C., Honduras. [**Incidence of the Principal Protozoan Intestinal Parasites in Tegucigalpa.**] *Rev. Med. Trop. y Parasit.* 1946, Oct. & Dec., v. 12, No. 4, 108–9, 1 chart.

The incidence of *Entamoeba histolytica*, *Trichomonas hominis* and *Giardia intestinalis* in the city of Tegucigalpa, D.C., Honduras, is more or less evenly endemic throughout the year.

In 1944–45, the author examined 21,125 stool specimens in the Central Public Health Laboratory, and found the incidence of these three protozoa to be respectively 30·28, 16·62 and 5·41 per cent. These results were obtained from examination of a single specimen in each case, and are therefore regarded as high, since sanitary conditions in Tegucigalpa are much better than in other parts of the country. *H. J. O'D. Burke-Gaffney.*

PAYZIN, S. Lamblia intestinalis ve trichomonas intestinalis ile yaz ishalleri arasinda ilgiler. [**The Relation of Summer Diarrhoea to the Presence of *Giardia* and *Trichomonas* in the Stools of Children.**] *Türk Hifzissihha ve Tecrübî Biyoloji Mecmuasi.* (*Rev. Turque d'Hyg. et de Biol. Exper.*). Istanbul. 1944, v. 4, 69–79, 3 figs. French summary 80.

In the summer of 1944, the author frequently found *Trichomonas hominis* and *Giardia intestinalis* in routine stool examinations: these had not been observed in the previous year.

During 1944, among 227 faecal examinations, 60 of which were from children, a total of 30 stools contained protozoa: all of these were from children. In 3 cases, both protozoa were present together, and in two others, *Entamoeba coli* was present in addition to one of these protozoa. From two stools, not containing protozoa, *Shigella* organisms were isolated.

Those stools which contained the protozoa were fermented and had a foetid odour: none of them contained pathogenic bacteria. All patients affected were cured by mepacrine or Spirocide.

The author makes the point that a search for intestinal protozoa should not be omitted in the presence of outbreaks of summer diarrhoea.

H. J. O'D. Burke-Gaffney.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

COGHILL, N. F., LAWRENCE, J. & BALLANTINE, I. D. **Relapsing Fever in Cyrenaica.** *Brit. Med. J.* 1947, May 10, 637–40, 2 charts. [89 refs.]

A description of the clinical features of four cases of relapsing fever seen in Cyrenaica at 82 General Hospital, Benghazi, followed by a discussion of the relevant literature, especially the Italian.

Before the war, Italian workers claimed to have identified three possible local carriers :—*Ornithodorus foleyi* Parrot (syn. *O. franchinii* Rondelli), *O. moubata*, and *O. savignyi* Audouin. Recently ADLER and THEODOR [personal communication to the authors] have identified ticks from Tobruk and the Egyptian western desert as *O. tholozani*, Laboulbène and Mégnin. The single Tobruk specimen was found to be naturally infected with relapsing fever spirochaetes. *E. Hindle.*

RAYNAUD, R., AUBIN, H. & PEGULLO, J. Syndrome de Guillain et Thaon post-récurrentiel chez un indigène algérien. [**Guillain and Thaon Syndrome following Relapsing Fever in an Algerian.**] *Algérie Méd.* 1947, Feb., No. 2, 150–51.

Report of a case.

MARIA GUERRERO, J. Tratamiento de la fiebre recurrente por medio de la penicilina [**Treatment of Relapsing Fever by Penicillin.**] *Rev. Facul. de Med.* Bogotá. 1946, Oct., v. 15, No. 4, 264–5.

A case in an infant of 2 months who received 20,000 units every three hours ; the temperature fell on the second day and the child made an uninterrupted recovery.

H. J. O'D. Burke-Gaffney.

LEVADITI, C. & VAISMAN, A. Action de la pénicilline sur le virus récurrentie résiduel névraxique. [**Action of Penicillin on Residual** *Trep. duttoni* **Infection in the Central Nervous System.**] *C. R. Soc. Biol.* 1946, Jan., v. 140, Nos. 1/2, 29–30.

Relatively small doses of penicillin, administered intracerebrally in mice with long-standing *Trep. duttoni* infections, destroyed the residual infection in the central nervous system, although quantities ten times greater proved ineffective in this respect when given subcutaneously.

H. J. O'D. Burke-Gaffney.

LEVADITI, C., VAISMAN, A. & NOURY, H. Syphilis et infection récurrentielle. [**Syphilis and Relapsing Fever.**] *C. R. Soc. Biol.* 1945, Nov., v. 139, Nos. 21/22, 972–4.

The following is a translation of the authors' summary.

Infection with *Trep. duttoni* does not suppress the distribution of virulent *Trep. pallidum* in mice suffering from clinically latent syphilitic infections, either in the sites of election or in the central nervous system.

H. J. O'D. Burke-Gaffney.

YAWS.

GUIMARÃES, F. N. Manifestações boubáticas discrômicas simulando pinta (" carate, mal del pinto, purú-purú "). [**Dyschromic Yaws Lesions simulating Pinta.**] *Brasil-Medico.* 1947, Mar. 22 & 29, v. 61, Nos. 12/13, 81–7, 2 figs. [21 refs.]

[An article of much interest on a subject meriting discussion by medical men from all parts of the tropics, but one which poses a problem soluble only after considerable further research.]

In a low-lying riverine district of Rio de Janeiro where the people live in primitive dwellings, the Oswaldo Cruz Institute established a post in 1945 for the study of yaws and its treatment by penicillin. Some 800 patients were dealt with. Among these were seven, whose cases are detailed, who presented symptoms regarded elsewhere as those characteristic of pinta : achromic and dyschromic patches on exposed parts, especially the hands, arms and feet, starting as erythematous or squamous papules, not as ulcers, followed in 5–12 months by secondary maculae and papules (" pintids "), with a positive Wassermann reaction, with juxta-articular nodules in two cases, ainhum in one ; all were negroes. Treatment with penicillin brought about a weakening to actual reversal of the W.R., improvement of symptoms, reduction to disappearance of the J.A.N. The penicillin was given by injection in two courses ; the first in doses of 2,000 Oxford units thrice daily, the second, after an interval of 6–9 weeks, with double the dosage. In two cases of those detailed, the first course was for 10½ and 5½ weeks respectively, and the second, 10 and 14 days. [The question opened up and calling for investigation and research by a team of workers is : Is there any connexion, and, if there is, what is the connexion, between yaws, syphilis, pinta, and bejel ?] *H. Harold Scott.*

LEPROSY.

BRITISH MED. J. 1947, May 24, 731. **Leprosy in Britain.**

Six cases of leprosy occurring in Britain in persons returned from the Far East are described. Two of them were early tuberculoid cases, diagnosed clinically and from the presence of anaesthesia : no *Myco. leprae* were found. Another was an advanced case, with infiltration of the face, patches on the body, and nerve lesions. *Myco. leprae* was found in scrapings from the corium. The need is stressed for keeping a diagnosis of leprosy in mind where resistant skin lesions of long duration are met with in persons who have been in countries where leprosy is endemic. Early lesions may be mistaken for ringworm, and anaesthesia should be looked for.

The importance of early diagnosis and treatment is obvious.

H. J. O'D. Burke-Gaffney.

DE SOUZA-ARAUJO, H. C. O problema da lepra na America do Sul. [**The Leprosy Problem in South America.**] *Mem. Inst. Oswaldo Cruz.* 1945, v. 43, No. 3, 583–98, 2 figs. [20 refs.]

CANAAN, T. **Immigration and Leprosy.** *J. Palestine Arab Med. Ass.* 1947, Mar., v. 2, No. 3, 72–8. [11 refs.]

RYRIE, G. A. **Some Impressions of Sungei Buloh Leper Hospital under Japanese Occupation.** *Leprosy Review.* 1947, Jan., v. 18, No. 1, 10–17.

Dr. Ryrie, who courageously stuck to his charge of the large Malaya Leprosarium during three and a half years of the Japanese invasion, brings out some important points in this article. The total number of patients fell from 2,510 to 660 and the children from 265 to only 21. The high death rate was due to famine, concurrent disease and deprivation of anti-leprosy and other drugs, such as quinine and antiseptics, on account of systematic looting. Suicide was also frequent among elderly males. The death rate rose to ten to fifteen times the previous rates; all significant anaemias, nephritis and tuberculosis and septic complications proved fatal, and malignant tertian malaria cases often ended in fatal cerebral complication. Hydnocarpus oil also ran very short, with the result that the peace-time annual discharge rate of 150–200 patients "cured" in the clinical sense, fell to nil. The most interesting observation was that within three or four months after the introduction of injections of 1–5 000 solution of potassium permanganate, for want of anything better, "the patients were unanimous in declaring that the new treatment was useless, and in demanding the restitution of Hydnocarpus oil." After making all allowances for malnutrition, the author concluded that: "when all criticisms are conceded, these years convinced me, as nothing else has done, of the real (I avoid the word 'specific') value of Hydnocarpus oil." *L. Rogers.*

MACKAY, A. G. **Notes on Leprosy Settlements. Tanganyika Territory.** *Leprosy Review.* 1947, Jan., v. 18, No. 1, 23–30.

In dealing with the scattered foci of leprosy in the enormous area of these territories, the author points out the advantages of several comparatively small provincial leprosy settlements over a single very large one. The task is simplified by the fact that only 5–10 per cent. of cases in Central Africa are lepromatous, 15 per cent. mixed and 75–80 per cent. neural; the neural type may for all practical purposes be regarded as non-infective, and hence does not require isolation. In the Makete Settlement, the incidence of leprosy in the children of infected parents is surprisingly low. The average population is about 1,500 and new patients construct their own houses. Each patient has a minimum of five acres of land so that after the first year the patients are self-supporting. Occupational therapy is encouraged to produce for the needs of the settlement. A good water supply is essential. Admissions are voluntary, so the settlements must be made attractive. Conjugal infections are very rare and therefore separation of husband and wife is rarely necessary, but any children born to them should be sent to relatives before they are six months old. *L. Rogers.*

WHARTON, L. H. **Leprosy Survey of School Children in British Guiana.** *Leprosy Review.* 1947, Jan., v. 18, No. 1, 30–33.

It is recognized that infection of children is the key to the leprosy problem; this is the first survey of school children in British Guiana to be reported. A total of 42,811 children, with approximately equal numbers of boys and girls examined, revealed 94 infections, 48 boys and 46 girls: an unusually large incidence among females. No less than 91 were early neural cases, which were treated at out-patient clinics; 1 was lepromatous and the remaining 2 were more advanced neural cases. The entire coastal area, which contains 90 per cent. of the whole population was surveyed, in the course of 18 months. Most of the cases were in children between 6–10 years of age. Two teachers were also infected. All the Government schools were visited and it is proposed to

examine the children in secondary and denominational schools at the next survey. It has not yet proved possible to examine the contacts of the cases discovered. Definite progress has been made in convincing the public that the disease can be cured, " and the remarkable results obtained in children treated as out-patients has been proof of this." *L. Rogers.*

BURDON, K. L. **Disparity in Appearance of True Hansen's Bacilli and Cultured " Leprosy Bacilli " when Stained for Fat.** *J. Bacteriology.* 1946, Dec., v. 52, No. 6, 679–80.

The author has studied, by means of his improved Sudan black B fat-staining procedure, both true Hansen's bacilli in films from cases of leprosy and cultured acid-fast organisms claimed to be those of leprosy. Heat-fixed films of leprosy material were stained with dilute carbol fuchsin only and characteristic clumps and globi of lepra bacilli located and ringed. After removing the immersion oil with xylol, Sudan black B solution was applied for 15 minutes or longer, and some of the films counterstained with dilute carbol fuchsin. The ringed organisms were then examined for evidence of stained intracellular lipid. The important observation was thus made that in the case of both tubercle bacilli and also in various cultured " leprosy bacilli ", stainable lipid was constant and prominent ; but no intracellular fatty material was observed in any films of true Hansen bacilli. Moreover, human tubercle bacilli in direct preparations from tuberculous tissues, as well as in most cultures, do contain matter which stains with Sudan black B. He suggests that his observations lend support to the view that the various acid-fast bacilli, which have been cultivated from leprous tissues from time to time, are not those of leprosy, but are saprophytic acid-fast bacilli, others of which also contain lipid staining particles.

L. Rogers.

HANKS, J. H. **A Study of the Bacilli in Tissue Cultures of Lepromata in Serum Media.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 21–30, 1 fig. [13 refs.]

This is the first of an important series of tissue culture experiments by this worker with quantitative control of the number of lepra bacilli. In an earlier paper [see this *Bulletin*, 1947, v. 44, 323] he described quantitative methods to determine if lepra bacilli had actually multiplied or not in certain culture media, and concluded that they had not. These methods have been used in the present experiments to examine the behaviour of leprosy bacilli in tissue cells maintained by *in vitro* cultivation. Those interested should refer to the original papers for the technical details, but the following are the results obtained.

Tissue cultures from lepromata from four patients showed good growth of fibroblasts for periods of 14 to 34 days, after which they began to degenerate. In two instances, small round cells were found in the early days for a short time only, but the bacilli-laden macrophages were unable to migrate into the plasma and the spread of cell suspensions from the fresh nodule showed only moderate numbers of free bacilli or globi. In sections, macrophages with many bacilli were recognizable, but fibroblasts contained few, if any organisms. After sixteen days, only fibroblast cells were present, and numerous bacilli were free after being deposited on the death of the host cells ; nearly all were centrally situated, with very few in surrounding plasma and the total number of bacilli did not appear to be increased. Opacity of the media was not due to the presence of numerous bacilli, as is held by some previous workers, and no evidence of bacillary growth was obtained. *L. Rogers.*

HANKS, J. H. **The Fate of Leprosy Bacilli in Fibroblasts cultivated from Macular and Tuberculoid Lesions.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 31–47, 3 figs. [13 refs.]

This paper deals with tissue cultures of macular and tuberculoid leprosy on similar lines to the above work. In this class of lesions, lepra bacilli are few and the patients' tissues are more resistant to them, so it should prove easier to decide if any increase in the numbers of organisms takes place in tissue cultures. A crucial test was based on cutting the new cell-growth away from the original "bacillated" explants in order to learn whether the bacilli persisted or increased in successive sub-cultures. For this purpose, the serum media were supplemented with embryo-juice to support continuous cell growth.

In the tissue cultures, outgrowth from the reticular epithelium of the skin appeared in 3 to 10 days, but they did not contain lepra bacilli, and are therefore of little interest. Outgrowth from the papillary layer usually appeared in 7 to 20 days and included pigmented cells before they became obscured by rapidly growing fibroblasts, which branched and ramified. Small round cells were seen early, but soon disappeared. Serum media also maintained fibroblasts from tuberculoid lesions for about a month. The addition of embryo-juice restrained the multiplication of fibroblasts, which grew to a large size and these tolerated lepra bacilli, but in active cultures the bacilli were not well tolerated, and were rapidly digested by them. After six to twelve weeks, both intra- and extracellular bacilli began to show evidence of autolysis or extraction, single bacilli became difficult to find and clumps were pale and fused.

The tedious method of counting bacilli in cultures from macular lesions revealed that the maximum number of intracellular bacilli occurred in early samples of cells, when portions of the original explants were present in cultures. This phenomenon is attributed to delayed transport of the bacilli from the primary explants. Any tendency towards a rising proportion of cells with bacilli, for a time, was reversed after 12 weeks; and the bacilli had disappeared almost entirely by the end of six months, as shown by comparing the bacilli during early stages of cultivation with those present after intervals of three to six months. A third method was to rely on non-proliferating control particles, such as pigment granules, as an indication that cells containing bacilli after the longest intervals were likely to contain material from the original explants.

The advancing border of tuberculoid lesions created a stronger impression of viable leprosy bacilli than did any other form of leprosy; but only in primary cultures from the papillary layer of the skin, which remained almost stationary in size. Enhanced destruction of bacilli was observed with greater degree of cell activity. In one experiment, fibroblasts free from bacilli were infected with bacilli from a nodule; they were promptly phagocytosed and destroyed by multiplying fibroblasts from these clinically resistant forms of leprosy.

L. Rogers.

HANKS, J. H. **The Fate of Leprosy Bacilli in Fibroblasts cultivated from Lepromatous Lesions.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 48–64, 6 figs.

The evidence accumulated in the previous paper, that the occasional bacilli found in cultures after six months were usually associated with pigment granules from the explanted skin, led the author to repeat tissue cultures of lepromatous tissues after injecting carbon particles into the explant. In making subcultures, new cell-growth was cut away from the heavily infected explants, and inert particles of the previously injected India ink were used for a comparison with the incidence of the bacilli.

It was found that in all media the most heavily infected cells contained unusual amounts of carbon, the two being found together in some particular portion of the cytoplasm. Dividing cells always showed particles around the nucleus, so they were equally divided between the daughter cells. High bacillary content in original explants was usually associated with high cell content, so that large numbers of bacilli were carried into the growth zone, and decreasing bacillary concentrations were revealed during continuous growth. The presence of embryo-juice in serum media enhanced the early growth of bacillus-containing cells, which also included many carbon particles. After several weeks, most bacilli were found in cells of luxuriant growth, but which soon "stalled" at 30°C.; but no cells with low incidence of bacilli returned to a heavily-bacillated condition. It was eventually found that the fate of the bacilli was similar to that of the accompanying carbon particles, except that the bacilli were less durable. No evidence was obtained that carbon particles were unfavourable to the bacilli, for the bacilli disappeared at about the same rate whether carbon was present or not.

The fibroblasts from lepromata were indifferent to high bacterial content and they brought about a gradual destruction of bacilli more rapidly than in cultures kept at a minimal rate of growth. Doubling the usual carbon dioxide pressures hastened the disappearance of the bacilli. The peripheral distribution of leprous lesions is doubtless dependent on the same conditions which influence the fate of bacilli in cultivated fibroblasts. The internal organs are characterized by higher cell populations, a greater incidence of mitotic cells, a more active metabolism and a lower *p*H than that of the peripheral tissues. In tissue cultures, modification of the growth-rate and the *p*H permits the physiological conditions to vary along similar lines with corresponding effects. *L. Rogers.*

HANKS, J. H. **The Question of Free Bacillary Growth in the Plasma surrounding Lepromatous Explants during Tissue Cultivation.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 67–9.

In this note, the author discusses the true nature of the turbidity of the plasma surrounding lepromatous tissue cultures, which some workers have taken as evidence of the multiplication of free bacilli. He attributes any apparent increase of bacilli to early cell outgrowth of fibroblasts containing them, and not to multiplication. The turbidity of the plasma is due to calcification.

L. Rogers.

HANKS, J. H. **The Influence of Carbon Particles on the Development of Rat Leprosy.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 65–6.

This note reports experiments to ascertain the effect of carbon from India ink on induced leprosy infection introduced into rats. Inked rat-lepromata were embedded in one flank of four rats, and white control explants in the other flank. After slight delay in development of the black explants after three months, the degree of infection on the two sides was indistinguishable. In ten more rats, approximately 35,000 bacilli suspended in India ink were injected under the skin of the left shoulder, and the same dose in saline on the opposite side. After three months, there were a few bacilli on the carbon side, but after six months the two types of lesions were practically similar and carbon particles had not prevented cells from becoming stuffed with lepra bacilli. Finely dispersed carbon particles afford a useful control substance in experiments on the multiplication of the micro-organisms. *L. Rogers.*

HANKS, J. H. **Attempts to infect Chick Embryos and Chick Tissue Cultures with Bacilli from Human Lepromatous Lesions.** *Internat. J. Leprosy.* Cleveland, Ohio, 1947, Jan.–Mar., v. 15, No. 1, 70–77. [18 refs.]

This paper reports attempts to establish experimental infections of leprosy bacilli, from lepromatous nodules, in chick embryos and chick tissue cultures in view of the remarkable series of successful cultures of viruses, etc. by that method. On account of the relatively short incubation period before hatching of the chicks, the lepra bacilli were injected into the yolk sac so as to be distributed throughout the embryo. In 24 experiments with incubation at 34° and 37°C., observations made failed to suggest that the bacilli were collected preferentially or were growing in any organ or tissue.

Chick tissue cultures of leprosy bacilli were next tried and maintained for long periods in the original vessels on media containing chick serum or fresh or pasteurized embryo juice, at different temperatures and with varying periods between renewals of the media. Successful chick tissue cultures were obtained with good growth of fibroblasts, a few of which might contain one or two bacilli. Carbon particles were also injected into embryonic breast muscle before preparing the explants to allow the response of both macrophages and fibroblasts to the bacilli to be observed. The tissue cultures lived longer at room than at higher temperatures. After 31 days, the ratio of bacilli to carbon appeared to be lower, bacilli paler and clumps less distinct, and in subcultures no bacilli were found at the end of four months. No signs of bacillary proliferation were observed in any of the tests, but a decreasing incidence or actual disintegration of the bacilli was usually observed. The results were therefore negative. *L. Rogers.*

FLOCH, H. & DE LAJUDIE, P. Sur la transmission de la lèpre par les arthropodes. [**The Transmission of Leprosy by Arthropods.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 138.* 1946, Oct., 3 pp. [10 refs.]

The author discusses the varied results of the many attempts to transmit leprosy by means of insects, and the large number of arthropods, harbouring acid-fast bacteria, which have been incriminated from time to time. Special reference is made to the Brazilian workers, DE SOUZA-ARAUJO, DE OLIVEIRO CASTRO and MARIANO, whose experiments, especially that of the first-named regarding the isolation of acid-fast bacteria from lepromatous lesions, have been extensively reviewed in this *Bulletin* [see especially 1945, v. 42, 1006–1010]. The present authors, working in French Guiana, examined 50 *Aëdes aegypti* and 235 *Culex fatigans* captured in leprosy wards and found acid-fast bacilli in 4 of the former and 8 of the latter: they also cultivated acid-fast bacilli on Löwenstein's medium from the crushed bodies of 4 *Triatoma rubrofasciata* which had fed on lepromatous lesions and 96 *C. fatigans* from leprosy wards: the bacilli could not be sub-cultured.

A culture of acid-fast bacilli which could be maintained on ordinary media was however obtained from 9 inoculations of *Boophilus microplus* collected from cattle. This strain has been studied and compared with de Souza-Araujo's strains, which it resembles biochemically and in its failure to produce a "tuberculin", but from which it differs in some cultural characteristics.

The author considers that the strains studied are related to the majority of the "paratubercle bacilli" isolated up to now, which do not produce tuberculins (although CABASSO [*Bulletin of Hygiene*, 1942, v. 17, 660] demonstrated a tuberculin in an acid-fast saprophyte isolated from a fly).

[It is noteworthy that MOISER [this *Bulletin*, 1946, v. 43, 454 ; *ibid.*, 1947, v. 44, 321], who found acid-fast bodies in 69 per cent. of cockroaches in a hospital and neighbouring kraals, and in the dried droppings of the insects, did not find them in the bodies of other insects, such as fleas, bugs or ticks. Moiser assumes that the acid-fast organisms found were " Hansen's bacillus " ; but in a comment on the first abstract quoted above, it is stated, on the authority of Professor BUXTON, that cockroaches eat a great variety of types of food, and that many types of bacilli, including presumably acid-fast organisms, may well be expected to be found as normal inhabitants of these insects. See also MOISER, below.

Short of transmission experiments—the difficulties of which are evident—the imposing amount of recorded work accumulating upon acid-fast bacilli in arthropods can hardly be expected to bear very fruitful results in its present form. If ever there was a need for a rigid fulfilment of Koch's postulates, this would appear to be one ; but in the absence of suitable experimental animals, the difficulties remain.] *H. J. O'D. Burke-Gaffney.*

MOISER, B. **Transmission of Hansen's Disease (Leprosy).** *Acta Med. Scandinavica.* 1946, v. 126, No. 4/5, 347–50, 4 coloured figs. on 1 pl.

This is a further paper in support of the author's hypothesis that infection is transmitted by the bites of cockroaches. It commences with the following emphatic statements, which will be accepted by few experienced leprologists. The exact manner of transmission " is still quite unknown ". [For several instances in which the patient developed the first signs of leprosy at the site of a wound made during operation on an infective patient, or by other direct inoculation of the infection, see *Leprosy* (ROGERS & MUIR) 3rd Ed., pp. 89–91.] " There is no proof whatever " that the disease is transmitted by infection or contagion. " Over 60 per cent. of my native patients had definitely never been in contact with the disease ". [How did they know they had never approached an unrecognized case ?] The author's long experience gives him " confidence in distinguishing M. leprae from other acid-fast bacilli, so that the bacilli found in the roaches in a Hansen Hospital can be positively claimed as M. Leprae." It is on microscopical examination alone that he bases this conclusion. He goes on to repeat that roaches ingest the bacillus of Hansen in great numbers when fed on leprous nodules and the organism can be found in their gut in large numbers up to the 19th day, and remain unchanged in the dried droppings of the roach for at any rate sixteen months. The most notable feature in roach-slides is the presence of groups of acid-fast oval bodies, which are illustrated by a coloured plate, together with a few free bacilli and an acid-fast mycelial branch. The only new point in this note is that Professor REENSTIERNA, of Sweden, at once recognized these oval bodies as greatly resembling the " maternal fungus ", which he had discovered in 1912 in a culture from blood taken from a Swedish leper, and which, in 1939, he had detected in direct films of blood taken from the arm-vein of another Swedish leper (in which he also found Hansen's bacillus), and which he also found in leprous nasal smears, etc. The author also repeats that he has reported similar bacilli in roaches caught in native huts, several miles from the leper hospital, in which no case of Hansen's disease has ever been known to occur. [The statement that Reenstierna discovered the " maternal fungus " in a culture from the blood of a leper seems to prove that it is very different from the true lepra bacillus, over seventy years' innumerable attempts to culture which have all proved negative. Confirmation or otherwise of Moiser's ingenious hypothesis will be awaited with interest.] *L. Rogers.*

TISSEUIL, J. De la confusion actuelle dans la classification des formes de la lèpre. Caractères principaux et secondaires. Lèpre cutanée et lèpre tuberculoide. [**Confusion in the Classification of Leprosy. Principal and Secondary Characters. Cutaneous and Tuberculoid Leprosy.**] *Bull. Soc. Path. Exot.* 1946, v. 39, Nos. 11/12, 430–40. [11 refs.]

The first half of this paper discusses the opinions of earlier writers, from DANIELSEN onwards, on the classification of leprosy into nerve and cutaneous forms and the author points out that JADASHON in 1891 first correctly described the characters of the tuberculoid variety. He goes on to criticize the inclusion of this form as a sub-division of the nerve type in recent classifications, and gives the following as its essential characters: A central zone of healing with lighter colour of the skin; an intermediate, yellowish, more or less infiltrated zone, with thickening more and more marked from the centre to the periphery; an outer ring of infiltration under the healthy skin, which is red or reddish-yellow, papular or regularly infiltrated. The patches increase at the periphery by slow extension from the diseased to the healthy tissue. No nerve symptom is peculiar to this variety of lesion and any nerve symptoms which may be present are of a subordinate nature. Loss of sensation ceases abruptly at the border of tuberculoid patches, which tend to be symmetrical. Classing them under nerve leprosy is therefore confusing. Only cutaneous lesions properly so-called may be classified as cutaneous and as tuberculoid leprosy; these two forms are clearly differentiated by their characters and their evolution.

L. Rogers.

COSTA, O. G. & MARIANO, J. **Tuberculoid Leprosy of Lupoid Appearance.** *Arch. Dermat. & Syph.* 1947, Apr., v. 55, No. 4, 474–7, 4 figs.

ERMAKOVA, N. E. **Injury of Nerve Elements of the Tongue Root in Lepromatous Leprosy.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 15–20, 7 figs. on 4 pls.

Histological examinations of the nerves of the root of the tongue in 7 fatal cases are recorded. The gustatory goblet cells of papillae at the root of the tongue were found to contain lepra bacilli, which had spread along the small sensory nerve fibres, in a centripetal direction, in specimens stained by the impregnation method of Gross-Bilshowvsky-Lavrentyev, and counterstained by the method of Ziehl-Neelsen. Small varicosities containing lepra bacilli were found on the nerve fibres, which in some places showed large varicosities of a similar nature, packed with bacilli; these might increase the diameter of a nerve fibre to five to eight times its normal, as shown in illustrations. Disconnected strings of bacilli were also found in lymphatic grooves of perineural sheaths for considerable distances from the papillae. Increase of the lymphoid elements was most noticeable in the neighbourhood of the papillae; this suggests that the infective bacilli spread centripetally along the nerves. Bacilli were not found in the epithelium of parts of the tongue other than those of the basal circumvallate papillae. Moreover, the nerve fibres which innervate the muscles of the tongue never showed lepra bacilli, so only the sensory nerves are involved.

L. Rogers.

BARONDES, R. de R. **Bone Absorptive Changes in Leprosy.** Reprinted from *Med. Record.* 1946, Sept., 5 pp.

BEAUDIMENT, R., LAVIRON, P. & ARETAS, R. Considérations sur la lèpre, son traitement, sa prophylaxie dans les colonies françaises. [**Treatment and Prophylaxis of Leprosy in French Colonies.**] *Méd. Trop.* Marseilles. 1946, Jan.–Feb.–Mar., v. 6, No. 1, 3–51.

The author records at length his views on the histology, classification, diagnosis, treatment and prophylaxis of leprosy as seen in French West African Colonies. They closely follow the generally accepted views, but the following points are worth noting. After describing the histological features of the different types of the disease, he suggests the following classification ; (1) IT, infiltration tubercular (lepromatous) ; (2) T, tuberculoid ; and (3) NS, non-specific. By the last term he appears to mean lesions which are not diagnostic, although a number of such lesions may be clinically suggestive of early leprosy. Among diagnostic points, he includes the pilocarpine test for loss of sweating power ; the histamine test to differentiate between early neural skin lesions and those of syphilis ; and late positive lepromin reactions in neural and tuberculoid cases ; but the sedimentation test is only of prognostic value. He deals at length with treatment and stresses the importance of neutralizing chaulmoogra oils used for injections. For perforating ulcers without bone necrosis, he advocates division of the sympathetic nerve fibres around the main arteries of the limbs, especially the popliteal ; but the operation may have to be repeated. For prophylaxis, he relies on agricultural colonies with ample land to cultivate, to which at first only lepromatous cases should be admitted. In view of the rarity of conjugal infections, married couples can be admitted, with early removal of children born to them. Sterilization is impracticable.

L. Rogers.

FLOCH, H. & DE LAJUDIE, P. Sur la lèpre en Guyane Française. III. Influence du traitement par l'huile de chaulmoogra. [**Leprosy in French Guiana : Effect of Treatment by Chaulmoogra Oil.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 135.* 1946, Sept., 11 pp.

DEIBEL, H. K. Over behandeling van " lepra " (tuberosum en nervosum) met een gewijzigd chaulmogra-preparaat. [**Treatment of Leprosy with a Modified Chaulmoogra Preparation.**] *Med. Maandblad.* Batavia. 1947, Mar., No. 8, 146–8.

The regular treatment of leprosy was not available to prisoners of war. This led the author to try a mixture of chaulmoogra oil 60, and cod-liver oil 40, parts, sterilized for half an hour. It was given weekly in doses of 1 cc. and then of 2 cc. intramuscularly, with effects which seem to have been obviously better than under the older treatment. The cod-liver oil should not be highly acid or injection will be painful.

W. F. Harvey.

FAGET, G. H. **Chemotherapy of Leprosy.** *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 7–14. [17 refs.]

This paper brings up to date the trials of sulphone compounds at the National Leprosarium at Carville, U.S.A. ; namely of promin, diasone and promizole. Promin has been used intravenously since March 1941 in doses of 1 gm., gradually increased to 5 gm., daily for two weekly periods with an interval of one week, usually in far advanced lepromatous cases. Improvement usually begins after six months and is progressive and in proportion to the duration and intensity of the treatment. The results are very similar with the other two drugs, the diamino-diphenyl sulfone in each being apparently the active

principle. Improvement was noted in 25 per cent. of the treated patients after six months ; in 50 per cent. after one year ; in 75 per cent. in two years ; and in almost 100 per cent. in three years. Nodules shrink and become absorbed ; ulcerations heal, including plantar ulcers ; regrowth of hair may occur, oral and nasal lesions clear up ; leprous laryngitis improves ; and tracheotomies become unnecessary ; eye lesions may also improve and febrile reactions cease to occur. Further, the proportion of bacteriologically positive tests progressively declines, and at the end of four years negative reports exceed 50 per cent. ; this strongly indicates bacteriostatic effects. Histological studies indicate elimination of the formation of new lesions through the blood stream. Nineteen promin-treated patients have been discharged after being negative for a year. Diasone and promizole have the advantage of oral administration, but they have not been used as long as promin, and are expensive. *L. Rogers.*

FAGET, G. H. & POGGE, P. C. **Treatment of Leprosy with Diasone. A Preliminary Report.** *Leprosy Review.* 1947, Jan., v. 18, No. 1, 17–23.

REENSTIERNA, J. **On the Specificity of an Anti-Leprosy Serum.** Reprinted from *Acta Dermato-Venereol,* 1943, v. 24, 311–16 in *Internat. J. Leprosy.* Cleveland, Ohio. 1947, Jan.–Mar., v. 15, No. 1, 78–82, 4 figs.

The author has recorded numerous trials in leprosy of a serum he made by repeated injection of sheep with Kedrowski's acid-fast bacillus cultivated from a leprosy case [see this *Bulletin,* 1943, v. 40, 152]. In this paper, he records the results of electrophoretic analyses of his serum made for him at the Upsala Institute of Physical Chemistry. Tracings are given of the results in both normal and anti-leprosy sera, to show that only in the latter are rises of the curves seen, which represent increased amounts of α, β, and γ globulins, the last being in the largest amount, while the albumin fraction is decreased. The data in a table show the γ globulin to average 13 per cent. in normal sera and 41 per cent. in the anti-leprosy serum. This difference indicates the presence of antibodies and thus strengthens the author's opinion that the therapeutic results obtained with the anti-leprosy serum are partially due to a specific action. *L. Rogers.*

DHARMENDRA & MUKHERJI, N. **Prognostic Value of the Lepromin Test.** *Leprosy in India.* 1946, July, v. 18, No. 3, 80–87. [11 refs.]

AUSTIN, C. J. **Control of Leprosy.** [Correspondence.] *Brit. Med. J.* 1947, Apr. 12, 506–7.

In this letter Austin quotes the following statement in a leading article in the *British Medical Journal* of November 2nd, 1946, p. 655 : " It soon became evident that compulsory isolation had become worse than useless." He goes on to defend the use of compulsory segregation in Fiji and quotes from an account of the work there [see this *Bulletin,* 1945, v. 42, 736] to show good results with 25 per cent. of admissions discharged as "arrested". He states that in dealing with the disease in 40 scattered islands, the voluntary system would not enable the earlier cases to be found and treated. He therefore protests " against the assumption that because a policy has been found impossible or inadvisable in certain areas it is thereby necessarily to be condemned everywhere."

In a short letter in the *British Medical Journal* of April 26th, ROGERS mentions that the leading article in question dealt mainly with his paper in

the same journal of June 1st, 1946, p. 825. He recalls that what he has condemned " as worse than useless " is the indiscriminate compulsory isolation of *all types of leprosy*, including a large proportion of uninfective neural cases, with consequent hiding of most patients until their disease has become too advanced to be amenable to treatment and they have infected members of their households—a plan now nearly universally modified. He quotes from a memorandum of 1925 his view that : " No hard-and-fast rules can be laid down to cover every area," and he agrees that Fiji, with only 2,775 cases in 1936 [see *Leprosy*, 3rd Edit., p. 14] is a very exceptional case where good work is being done. [A table of estimated leprosy cases in the British Empire shows that out of a total of 1,733,482 no less than 1,722,900 (over 99 per cent.) are in Asia and Africa, where no one would now suggest the possibility or advisability of attempting the old wholesale segregation plan. See *Leprosy*, 3rd Edit., p. 48.] *L. Rogers.*

HELMINTHIASIS.

MAY, Ella L. **Parasitologic Study of 400 Soldiers interned by the Japanese.** *Amer. J. Trop. Med.* 1947, Mar., v. 27, No. 2, 129–30.

The 400 American soldiers referred to in this paper had been interned in the Philippines and in Japan for more than 3 years.

Laboratory examination of 1,692 stool specimens, mostly by zinc sulphate floatation, revealed the presence of parasites in 86 per cent. ; 76 per cent. of the men showed parasites usually regarded as pathogenic.

Trichuris was found in 40 per cent. ; hookworms and *Ascaris* in 35 per cent. each ; *Entamoeba histolytica* in 11 per cent. ; *Endolimax nana* in 15 per cent. Other parasites were in small numbers. It is noted that ova of *Trichostrongylus* were found in five patients, and its resemblance to that of hookworm and *Heterodera radicicola* is stressed. It is also noted that in over 60 per cent. of cases, two species of worms were present and in 1 per cent. four species were found. *H. J. O'D. Burke-Gaffney.*

OLIVER-GONZÁLEZ, J. **Immunological Relationships among Polysaccharides from various Infectious Organisms.** *J. Infect. Dis.* 1946, Nov.–Dec., v. 79, No. 3, 221–5.

OLIVER-GONZÁLEZ and TORREGROSA [this *Bulletin*, 1945, v. 42, 45] have shown that a polysaccharide obtained from *Ascaris suum*, *A. lumbricoides*, *Trichinella spiralis*, *Necator americanus*, *Schistosoma mansoni* and the larval form of *Taenia solium*, inhibited the α and β isoagglutinins present in human sera ; and a polysaccharide substance which also inhibits the α isoagglutinins has been isolated from Type I pneumococci by WITEBSKY, METER and SOBOTKA (*J. Exper. Med.*, 1935, v. 61, 703) and from Type XIV pneumococci by BEESON and GOEBEL (*ibid.*, 1939, v. 70, 239). The paper here abstracted records further studies of the immunological relationships of these substances.

For the author's technique and the details of his experiments, the original paper must be consulted. He was able to isolate polysaccharide fractions from *Ascaris lumbricoides*, *Trichinella spiralis*, *Fasciola hepatica* and the spiny-headed worm of the pig, *Macracanthorhynchus hirudinaceus*. Polysaccharides derived from Pneumococci, Types I, III and XIV were supplied by Dr. W. F. Goebel.

The author found in precipitin tests a high degree of cross reactivity between the polysaccharides which indicated a close immunological relationship between

them. Cross reactions were observed, not only between polysaccharide test antigens, and heterologous rabbit antisera, but also between whole adult worm antigens and heterologous polysaccharide rabbit antisera. The fact that the helminths from which the polysaccharides were obtained belong to three different zoological classes of animals, suggests that cross reactions may occur with all species of helminths during artificial immunization or infection. All the polysaccharides also inhibited the α1 and α2 isoagglutinins in Group B human sera.

The polysaccharide isolated from the spiny-headed worm of the pig (*M. hirudinaceus*) did not, however, react heterologously with the polysaccharides from the other helminths and did not inhibit the α1 and α2 isoagglutinins in human sera. This fact suggests that the cross reactions which occur between polysaccharides obtained from the helminths used other than *M. hirudinaceus* are due to an isoagglutinogen-like substance present in the polysaccharides.

The pneumococci used also contained a polysaccharide substance which inhibits α1 and α2 isoagglutinins in human sera, so that cross reactions between these pneumococci and the helminths may also occur.

The author discusses the significance of the fact that his technique excludes the use of either acid or alkali. He points out that treatment of the material used for the preparation of the polysaccharides with alkali might destroy the isoagglutinogen-like substance, WITEBSKY *et al.* [*loc cit.*] having shown that treatment of Type I pneumococci polysaccharide with sodium hydroxide destroys its power of removing the α isoagglutinins from sera. Polysaccharides isolated from helminths by a method which excludes the use of acid or alkali may therefore contain more than one antigen, " in that the isoagglutinogen-like substance is qualitatively different from the precipitinogen. In other words, inhibition of the agglutinins in the polysaccharide antiserums was not accompanied by inhibition of the precipitins." *G. Lapage.*

CAWSTON, F. G. **Schistosomiasis in Southern Africa.** *Acta Med. Scandinavica.* 1947, May 17, v. 127, No. 6, 509–13, 2 figs.

HASHEM, M. **The Aetiology and Pathogenesis of the Endemic Form of Hepato-Splenomegaly " Egyptian Splenomegaly".** *J. Roy. Egyptian Med. Ass.* 1947, Feb., v. 30, No. 2, 48–79, 17 figs. (2 coloured) & 4 charts. [30 refs.]

Schistosomal hepatic fibrosis accompanied by splenomegaly, leucopenia and hypochromic anaemia is endemic in Egypt. Among 1,113 autopsies performed on adults, cirrhosis of the liver was found in 171 cases (15·4 per cent.) and of these, 120 (about 71 per cent.) were of the schistosomal fibrotic type. Among 892 autopsies on infants and children, cirrhosis of the liver was found in 29 (3·25 per cent.) and among these schistosomal fibrosis occurred in 10 (about 35 per cent.). Excluding Cairo because of its mixed population, the incidence of endemic hepato-splenomegaly was 90 per cent. in Lower Egypt and roughly corresponded with the known distribution of *S. mansoni* infection. In the case of the 10 children who at autopsy showed schistosomal fibrosis of the liver, eggs were found in the urine of 20 per cent. and in the stools of 60 per cent. Pathological evidence of intestinal schistosomiasis was found in 100 per cent. and of urinary schistosomiasis in 90 per cent. In the adult series, the clinical records showed that ova were found in the urines of 9 per cent. and in the stools of 25 per cent. of the patients. At autopsy, urinary schistosomiasis was found in 66 per cent. and intestinal schistosomiasis in 74·6 per cent. Eggs were found in 75 per cent. of the schistosomal fibrotic livers. In all cases in which the ova found in the liver could be differentiated, they were of the *S. mansoni* type. Irrespective of the original site of infection selected by the worm, liver

disease was about four times as often the result of *S. mansoni* than of *S. haematobium* infection.

Injection experiments suggest that in schistosomal hepatic cirrhosis, the fibrous tissue is supplied by the hepatic artery while the liver parenchyma is supplied by the portal vein. Preservation of the normal lobular pattern and absence of evidence of activity of the hepatic cells are definitely against regeneration of liver parenchyma in schistosomal cirrhosis. This view is supported by the fact that in almost every case of cirrhosis of the liver complicated with primary liver cell carcinoma, the cirrhosis was of the Laennec and not of the schistosomal type. This is explicable on the basis that the regenerative activity of the liver cells in the former is more liable to carcinomatous transformation since the cirrhosis follows degeneration of liver cells; while in schistosomal cirrhosis, the fibrosis is essentially interstitial and consequent on infiltration of schistosomal ova or occasionally worms in and around the fine portal tracts.

F. Murgatroyd.

HERNÁNDEZ MORALES, F., PRATT, Caroline K. & OLIVER GONZÁLEZ, J. **The Treatment of Schistosomiasis *Mansoni*. Evaluation of the Parasitotropic Effects of Fuadin and Tartar Emetic.** *Puerto Rico J. Pub. Health & Trop. Med.* 1946, Dec., v. 22, No. 2, 224–7. [Spanish version 228–32.]

The purpose of the present paper is to compare the parasitotropic effects of Fouadin and tartar emetic. Every patient diagnosed as infected with *S. mansoni* was subjected to treatment. In order to obtain fair and comparable results, no attempt was made to classify them.

Five cc. of Fouadin were given intramuscularly into the gluteal region on alternate days; tartar emetic was administered intravenously, 5 cc. of a 1 per cent. solution, on the same spacing. Examination of faecal specimens was undertaken every two weeks by a modified de Rivas concentration technique.

Treatment with Fouadin.—Two hundred and two patients were treated with one course, a total of 45 to 50 cc. being administered in each case. Sixty-six who were not cured were given a second, and 36 refractory cases a third, course. The results indicate that, when the first course proves unsuccessful, further administration of the drug becomes less efficacious: thus, one course produced 60·4 per cent. apparent cures, a second course, 48·49, and a third, only 36·22.

Treatment with tartar emetic.—Thirty-five patients were given one course of 60 cc. of tartar emetic. Treatment was stopped because of toxic reactions in two —one on account of visual impairment. In two patients ova were again found, and they received a further course. Twenty-two received a course of 120 cc. and a percentage of 54·54 cures was obtained. A second course of 120 cc. in 13 patients increased the percentage of cures to 76·3.

On these premises the authors feel justified in considering tartar emetic effective against *S. mansoni* when administered in courses of at least 120 cc. of 1 per cent. solution. In this respect it has a slightly stronger parasitotropic effect than Fouadin, though the ease with which this latter can be administered and its low toxicity combine to render it the drug of choice. It is also recommended that whenever the first course of Fouadin is unsuccessful, other antimony preparations should be used.

P. Manson-Bahr.

PALMER, E. D. **Results of certain Studies on the Stomach in *Schistosomiasis japonica*.** *Amer. J. Trop. Med.* 1947, Jan., v. 27, No. 1, 45–9.

In this slight paper the author records the results of gastroscopic examinations made on seven American soldiers with *S. japonicum* infections, and on seven controls free from that condition. The examinations (not less than two per

patient) were adequately made ; they did not reveal any change which could be attributed to *S. japonicum*, and the author thinks that, in relatively light infection, the mature worms do not usually inhabit veins so high as those of the stomach. He notes that others have shown that both *S. japonicum* and *S. mansoni* regularly inhabit the veins of the rectum. *Charles Wilcocks.*

MASON, P. K., DANIELS, W. B., PADDOCK, F. K. & GORDON, H. H. **Latent Phase of Asiatic Schistosomiasis.** *Arch. Intern. Med.* 1946, Dec., v. 78, No. 6, 662–78. [Refs. in footnotes.]

This study is based on the observation of 300 American soldiers admitted to Harmon General Hospital approximately six months after the onset of acute symptoms of schistosomiasis.

From the case histories and the patients' reports, an analysis of the early symptoms was made. Almost constant symptoms were loss of weight (100 per cent.), tenderness in upper part of abdomen (95 per cent.), abdominal pain (91), anorexia (91) and fever (89) : frequent symptoms were headache (67 per cent.), myalgia (65), dry cough (65), lethargy (61), sweating (54), stiff neck, diarrhoea and chills (50), palpable liver (44) and urticaria (27 per cent.) ; rarer symptoms were palpable spleen (14 per cent.) and jaundice (10 per cent.).

The stools were examined by direct smear in all cases and in some by concentration methods. During an initial admission period of two weeks, at least six stool specimens were examined ; if these were all negative, six other stools were examined after a period of four weeks' leave ; and if these were also negative, six more examinations were made after another period of three weeks' leave. In only 17 per cent. of those eventually found positive were ova found at the first examination ; in 13 per cent. of cases no ova had been found by the 10th examination ; and in at least three cases more than 20 examinations were made before ova were found. After treatment of the infected patients, the same routine was followed ; on an average, 19 negative stools during a period of 3½ months were obtained in 47 of 57 patients discharged as cured. An attempt is being made to follow these patients for longer periods.

All the patients appeared to be in good physical condition when admitted ; none was acutely ill, but 85 per cent. had residual minor symptoms, *e.g.*, abdominal discomfort (52 per cent.), weakness (25 per cent.), myalgia, headaches, nervousness and palpable liver (11 per cent.). During the first two weeks, ova were found in 30 per cent. of patients with symptoms and in 38 per cent. without symptoms.

During the acute phase (overseas) only 22 per cent. of patients had total leucocyte counts below 10,000 per cmm. and only 6 per cent. an eosinophile percentage below 9. In contrast, during the present study, 64 per cent. had total counts below 10,000 per cmm. and none above 20,000, and 50 per cent. had eosinophile percentages below 9. The average eosinophile count of 140 patients was 14 per cent., of which one-fourth had 20 per cent. or more. Four to six weeks after successful treatment, the average of 45 patients was 6 per cent., with none more than 20 per cent., but after unsuccessful treatment, the average eosinophile count of 32 patients was 10 per cent., of which two patients had over 20 per cent. There was a tendency for a high eosinophile count to indicate the persistence of ova, but there were too many exceptions to make it a good diagnostic criterion.

Proctoscopic examinations of all 300 patients were made and in only three were definite lesions found.

Liver function tests were carried out on 250 cases ; in only a few, about 10 per cent., were the tests positive whether ova were present or not. Two patients were accidentally killed : both had livers that were riddled with miliary

abscesses and fibrotic nodules surrounding schistosome ova, although in one no ova had been found in the stools for 5 months and in the other the liver function tests were all normal.

Out of 481 patients considered to be suffering from schistosomiasis, eight showed neurological symptoms ; three showed definite disseminated encephalomyelitis and three stupor. Six cases showed some cranial nerve involvement.

Treatment.—Of those patients who had had Fouadin prior to admission, 36 per cent. showed ova in their stools, whereas of those who had had potassium antimony tartrate, only 12 per cent. relapsed.

The routine treatments in the Harmon General Hospital were Fouadin 6·3 per cent., intramuscularly on alternate days, starting with 1·5 ml., 3·5 ml. and 5·0 ml. and continuing the last dose up to a total of 65 ml., (later a total of 105 ml. was given) for potassium antimony tartrate, 0·5 per cent. solution in isotonic saline intravenously on alternate days, commencing with 8 ml., 12 ml., 16 ml. and 24 ml. and continuing with 24 ml. up to 320 ml. (later a total of 416 ml. was given).

After the first course of Fouadin, there were 82 per cent. of failures (ova still present) ; and after the second course (of 65 ml.) there were still 69 per cent. failures. On the other hand, after the first course of potassium antimony tartrate (320 ml.) there were only 19 per cent. of failures.

No serious toxic symptoms were observed after either drug ; but with potassium antimony tartrate, many showed mild symptoms, coughing, nausea, vomiting and joint and muscle pains. With Fouadin, only joint and muscle pains were observed. Electrocardiographic observations were made in 66 patients : the alterations were limited entirely to changes in the T-waves. Thirty-one per cent. of patients on potassium antimony tartrate showed iso-electric levels or sharply inverted T-waves. Of these, 90 per cent. were again normal after a 30-day interval.

The symptoms also tended to disappear with the disappearance of the ova. Ninety per cent. of patients were symptom-free at the end of a period of observation of approximately three months, compared with 15 per cent. prior to treatment.

The authors conclude that potassium antimony tartrate given intravenously and slowly in 0·5 per cent. isotonic solution, in the doses indicated above, is the treatment of choice. They also stress the need for following these patients for longer periods. *L. E. Napier.*

GALLIARD, H. & NGU, D. V. Particularités du cycle évolutif de *Diphyllobothrium mansoni* au Tonkin. [**The Particular Nature of the Life-Cycle of** *Diphyllobothrium mansoni* **in Tonking.**] *Ann. Parasit. Humaine et Comparée.* 1946, v. 21, Nos. 5/6, 246–53, 4 figs.

The life-cycle of *Diphyllobothrium mansoni* as demonstrated experimentally in Tonking by Galliard and Ngu, differs in a very interesting way from previous conceptions of the mode of transmission in the genus *Diphyllobothrium.* These authors show that although the frog is the final transmitter of the infective plerocercoids to the canine definitive host, another essential intermediary is interpolated between *Cyclops* and the frog.

In the early part of the experimental cycle, 100 per cent. of *Cyclops* became infected with procercoids 17 to 20 days after exposure. *C. leuckarti* and another undetermined species were susceptible but the males only became infected. Attempts to infect frogs, *Rana tigrina,* with plerocercoids by feeding them with infected *Cyclops* failed completely, although this species of frog normally harbours large numbers of plerocercoids at certain times during the year. These data

led to the supposition that a *third* intermediate host might be essential to the life-cycle and to the demonstration of the easy infectibility of tadpoles with plerocercoids on feeding them with infected *Cyclops*. Infected tadpoles became sluggish and even motionless a week later and were devoured by others more active. Twenty to thirty days later the mortality amongst the infected tadpoles rose from 2 per cent. to 20 per cent. The plerocercoids leave their dead hosts and survive in the water for two hours, but they are usually swallowed alive by other tadpoles. A dog was infected experimentally with plerocercoids from tadpoles and began to pass eggs 20 days after the infective feed. Since, however, dogs would not normally become infected from tadpoles, a more likely transmitter was sought and it was found that if infected tadpoles were fed to frogs, the latter became infected with plerocercoids which were observed penetrating the stomach wall and migrating in tissues. Similar results were obtained with guineapigs and rats.

The resistance of *Rana tigrina* to infection from procercoids, together with the ease with which plerocercoids from tadpoles can infect it, indicate that under natural conditions the tadpole is an indispensable third intermediary in the life-cycle of *D. mansoni* in Tonking. *J. J. C. Buckley.*

NEGHME, A. & FAIGUENBAUM, J. Nueva modalidad de tratamiento en las teniasis. [**A New Method of treating Taeniasis.**] *Rev. Med. Chile.* 1947, Jan., v. 75, No. 1, 54–7.

The treatment of *Taenia solium*, *T. saginata* and *Hymenolepis nana* infections by means of quinacrine products, such as atebrin [mepacrine] is described. The tapeworms were expelled in 25 of 30 patients so treated.

H. J. O'D. Burke-Gaffney.

VAN AMERONGEN, A. J. Over het voorkomen van de taenia echinococcus (*Echinococcus granulosus*) in de provincie Gelderland. [**Echinococcosis in Dutch Gelderland.**] *Tijdschr. v. Diergeneesk.* 1947, Apr. 15–May 1, v. 72, Nos. 8/9, 237–42.

Holland has many difficult post-war problems which concern the public health authorities :—malaria in areas reduced by flooding to swamp and, in the present case, hydatid disease caused by widespread infection with tapeworm of mongrel and ownerless dogs left by the enemy soldiery. An investigation carried out in what seems to be the most heavily affected province, Gelderland, showed that of 133 dogs which came under suspicion, and of which 98 were autopsied, 43 were found to be carriers of *Echinococcus granulosus*. This very small tapeworm, 2½–9 mm. in length, can be seen macroscopically in the 3rd part of the duodenum and first part of the jejunum as a very white object. Diagnosis by examination of the dogs' faeces is tedious and thankless and the infected dog is usually symptomless. The embryophore, which has escaped from the egg and contains the oncosphere, or 6-hooklet embryo, is not specifically recognizable as an echinococcus : that requires the terminal, sexually mature, ripe 3rd proglottis, which is shed into the faeces. No owner, then, can be sure that his own dog is not a carrier. It may be a considerable danger to intermediate hosts—man, pigs and cattle. In man, the ingested oncosphere from faecally contaminated material may travel by lymphatics or veins to liver, heart, lungs, brain, or kidney and produce in due course the hydatid cyst, as large as a man's head, which will require a dangerous operation for removal some ten years after the infection. The prospects of treatment of the dog population are not very bright. If the dog is chained up, the tapeworm will

ultimately die, but that may require at least 5 months. The law applying to inspection is not sufficiently rigid. It seems certain that not only public slaughter-houses but also all private slaughterings of animals should be supervised by the veterinary practitioner or inspector, and the contamination of the affected localities by infected animals prevented. The dog may reinfect itself, while the sexually mature 3rd proglottis may contain as many as 500 eggs and may maintain an independent existence for a short time. Fertilized eggs are very resistant and may remain capable of development for months.

The original infection in Gelderland seems to have been caused by dogs housed in farms, and the laxity in regulations for slaughtering that prevailed during the war. *W. F. Harvey.*

ARMAND UGÓN, V., VICTORICA, A. & SUÁREZ, H. Equinococosis pleural secundaria. [**Secondary Echinococcal Disease of the Pleura.**] *Hoja Tisiológica.* Montevideo. 1945, Sept., v. 5, No. 3, 245–65, 28 figs.

An account of seven cases, treated surgically.

MAQSOOD, M. **Echinococcosis in Bovines.** *Indian J. Vet. Sci. & Animal Husbandry.* 1946, Mar., v. 16, Pt. 1, 28–31, 2 pls. [14 refs.]

LOUGHLIN, E. H. & STOLL, N. R. **Fomite-borne Ancylostomiasis.** *Amer. J. Hyg.* 1947, Mar., v. 45, No. 2, 191–203, 1 fig. [17 refs.]

Three enlisted men of the U.S. Navy who had been handling the soiled bed-clothes of patients infected with hookworm (mainly *Ancylostoma duodenale*) developed relatively heavy hookworm infections. The bed-clothing had been allowed to become damp and had been kept several days in this condition before being sorted and washed. The men each complained of itching and redness of the hands, wrists and forearms immediately after handling the bed-clothing, and also of coughing at night and a burning sensation in the throat for several weeks after starting the work. It was concluded that these laundrymen had acquired their infections from the bed-clothing, and the experimental work reported here was undertaken.

Three sets of fomites were obtained from the paediatric ward of a hospital; these consisted of cotton blankets, nightdresses and diapers. They were damped repeatedly and kept for five days. They were then rinsed thoroughly; the water in which they were rinsed was sedimented several times; finally, the sediment was centrifuged and an examination made for larvae. In the first two sets, where there was no visible faecal contamination, the larvae counts were 8,060 and 2,080, and the third, where there had been gross faecal contamination, 23,500; they were vigorous and active filariform larvae.

Further batches of fomites were "cultured" and egg counts were made from the faeces of the patients. After making allowances for loss of larvae during isolation, it was calculated that in several instances one gramme of egg-containing faeces must have been smeared on "off-white" fomites that had appeared to be free from faeces, and in the case of one dark-coloured blanket as much as three grammes.

An investigation aimed at direct isolation of infective hookworm larvae from fomites in the homes of Guamanian natives produced small numbers of larvae in a few instances only.

It has been shown by AUGUSTINE [this *Bulletin*, 1923, v. 20, 244] and CHANDLER [*ibid.*, v. 22, 889] that lateral migration of hookworm larvae in soil is practically nil, *e.g.*, none of 5,942 larvae was found outside a ring of 4 inches

from the inoculated area and a negligible number beyond 2 inches. In one of the present authors' experiments with stretched cotton blankets, it was found that of 22, 413 laterally migrating larvae 60·5 per cent. had migrated more than 2 inches from the area in which the egg-containing faeces had been placed, 11 per cent. more than 4 inches, and some as far as 8 inches. In a second experiment, in which 31,689 larvae were found beyond the inoculated area, 27 per cent. were beyond 2 inches, 4 per cent. beyond 4 inches, and 20 larvae (0·07 per cent.) beyond 8 inches.

The epidemiological implications of this observation of "fomite-borne" ancylostomiasis were discussed. At the time of, and shortly after, the American re-occupation of Guam, many young children and infants with severe, even fatal, ancylostomiasis were admitted to the Agana hospital. Some of these belonged to age-groups usually free of ancylostomiasis and it is thought that these might have been infected from the dirty and damp bed-clothing to which they were exposed during the exceptional conditions that prevailed. It is also thought that reinfection from their own soiled clothing was not uncommon amongst the fighting personnel under combat or training conditions in a damp tropical climate.

The climatic conditions on Guam where these experiments were carried out are summarized as: mean monthly minimum and maximum temperature—76° and 86°F.: relative humidity at 6 a.m. 86 per cent. and at 2 p.m. 73 per cent.: rainfall 91 inches.

[It is not clear why the word "fomite-borne" is used. The word is *fomes*, plural *fomites*, as indicated in a footnote; it should therefore be "fomes-borne" or, since the plural is the more familiar word, "fomites-borne".]

L. E. Napier.

BARBER, F. **Surgical Aspects of Roundworm Disease.** *Brit. Med. J.* 1947, Jan. 11, 49–50.

The author, practising as a surgeon to the native population in Cyrenaica, repeatedly encountered roundworm infestation simulating surgical conditions. Three cases are quoted.

(*i*) A boy of 13 was brought to hospital with spastic abdominal pains and violent vomiting. He had restricted abdominal movements, tenderness and rigidity, especially in the right iliac fossa. Appendicitis was diagnosed. At operation much turbid fluid was found but no pus. The appendix was free but had a pink tip; it was removed and found to contain a faecolith. A presenting loop of ileum which was crammed with *Ascaris lumbricoides* was opened and 91 worms were removed. He made an uninterrupted recovery, and, at a later date, anthelmintic treatment produced a few more worms.

(*ii*) A girl of 5 was admitted with abdominal pains and retching, and she had a temperature of 99·5°F. and slight local abdominal signs. Intestines distended with worms could be felt through the abdominal wall. Santonin and castor oil were given and masses of ascarides were passed. All symptoms subsided.

(*iii*) A boy of 3 was admitted with abdominal pain and vomiting of two days' duration and no motion for three days. The temperature was 101°F. The breathing was thoracic, the abdomen distended, tender and rigid, and there was free fluid. At laparotomy the appendix was found normal, but the abdomen contained bloodstained turbid fluid of slightly faeculent odour and a loop of intestine containing worms was thickened with inflammatory infiltration and was kinked. An opening was made and 30 worms removed. A drain was

inserted and the abdomen closed. The child improved at first but later deteriorated and died 12 days after operation, with numerous ascarides emerging from the nose and throat.

The author considers that, in a country where this infection is prevalent, ascaris infestation should always be kept in mind; operation will often be avoided. If operation is performed, as complete removal of worms as possible is indicated since anthelmintics are contra-indicated for two weeks after incision of the gut. *L. E. Napier.*

GALLIARD, H. & NGU, D. V. Technique de numération des microfilaires du sang en goutte épaisse. [**Technique of Counting Microfilariae in a Thick Blood Film.**] *Ann. Parasit. Humaine et Comparée.* 1946, v. 21, Nos. 5/6, 254–6, 2 figs.

A method based on calculating the approximate thickness of the film from the number of leucocytes present.

SHARMA, G. K. & HUSSAIN, A. **A Note on Guinea-Worm Infection in Dogs.** *Indian J. Vet. Sci. & Animal Husbandry.* 1946, Mar., v. 16, Pt. 1, 31–2.

This paper records the finding of three adult *Dracunculus medinensis* in different sites in the legs of a bull-terrier in Lahore. Other cases in the literature are also quoted. Smears from the residual ulcers and from the ruptured uterus of one of the adult parasites showed larvae of the worm. A second case was observed later in an Alsatian, which harboured *D. medinensis* in an eruption on the brisket.

The first case is illustrated by a photograph, which shows the adult *Dracunculus* clearly emerging from the right metatarsus.

[The possibility of infected dogs being a source of pollution of drinking water should be kept in mind.] *H. J. O'D. Burke-Gaffney.*

STOLL, N. R., CHENOWETH, B. M., Jr., & PECK, J. L., Jr. **Low Incidence of *Enterobius vermicularis* in Natives of Guam, M.I.** *Puerto Rico J. Pub. Health & Trop. Med.* 1947, Mar., v. 22, No. 3, 235–43. [Refs. in footnotes.] [Spanish version 244–53.]

"An exceptionally low incidence for *Enterobius vermicularis* (one per cent.) was found among native Guamanians examined by scotch tape. Necropsies failed to reveal pinworms. Earlier records point to a low incidence of pinworms for at least several decades. This record indicates that conditions on Guam, in which there occurs widespread intestinal parasitism, do not favor the life history of this parasite.

"Of subsidiary interest is the absence of evidence of tapeworm infections in natives of Guam. In the case of *Hymenolepis nana*, this suggests that unfavorable conditions for its transmission are related to conditions unfavorable for *Enterobius*."

GÉRARD, R. Petite épidémie de trichinose en Algérie. [**A Small Outbreak of Trichinosis in Algeria.**] *Rev. Méd. Nav.* (*Métropole et Outre-Mer*). 1946, v. 1, No. 4, 353–62, 1 chart.

DEFICIENCY DISEASES.

HARE, K. P. **Kwashiorkor (Malignant Malnutrition) arising in Assam.** *J. Trop. Med. & Hyg.* 1947, Apr., v. 50, No. 4, 63–8. [15 refs.]

The chequered history and nomenclature of the malignant malnutrition syndrome, now generally associated with kwashiorkor, are indications of its complex nature and aetiology. The author briefly reviews the distribution of the condition, commonly described in East and West Africa and in South America, and discusses its symptomatology. Apart from a few doubtful cases, the disease does not appear to have been reported hitherto from India.

Reference is made to the first use of the term "kwashiorkor" by WILLIAMS [this *Bulletin*, 1934, v. 31, 344] and the adoption of the name "malignant malnutrition" by TROWELL and MUWAZI [*ibid.*, 1946, v. 43, 363]. The author wisely defines his terms of reference by adopting as criteria of diagnosis certain essential features set out by Trowell and Muwazi and also in an important study by HUGHES [*ibid.*, 766].

These features are sufficiently important to merit quoting in full. They are the following :—

Diagnostic features :—

(1) Failure of growth or gross loss of body weight.
(2) Oedema.
(3) Crazy-pavement dermatosis.
(4) Diarrhoea and, frequently, steatorrhoea.
(5) Angular stomatitis.
(6) Deficiency bowel pattern on radiography.
(7) Fatty degeneration of the liver.
(8) High mortality, often with sudden and unexpected death.

Secondary features :—

(1) Anaemia of varying type.
(2) Alopecia and depigmentation of the hair.
(3) Generalized pallor of the skin.
(4) Nervous irritability followed by lethargy.

The author states that while Trowell and Muwazi believe the disease to be due to a complex nutritional deficiency, mainly of protein and the vitamin B complex, Hughes considers it primarily as a severe manifestation of ariboflavinosis complicated by hypoproteinaemia.

Previous full dietary summaries among labourers in the Assam tea gardens appear to have been few : but the work of MITRA, summarized by NAPIER and MAJUMDAR [this *Bulletin*, 1939, v. 36, 418] is quoted, and the author believes that the diet of labourers in his district in north-east Assam is probably almost identical with that described in Mitra's survey : in the author's districts milk and its products are not consumed ; and meat, fish and eggs are taken only sparingly by a few people. The regular diet consists largely of rice, *dal* (lentils), leafy and non-leafy vegetables, molasses, mustard oil, spices and salt. Fermented rice beer is taken copiously at the week-end, and in some cases, a small allowance of fish and meat is consumed.

The common local deficiency diseases are microcytic, macrocytic and mixed anaemias, nutritional oedema, various manifestations of vitamin A deficiency, and nutritional diarrhoea (commonly curable by nicotinic acid.)

Among 20,000 people, the author in nine years, has not seen more than half a dozen cases of true beriberi, and only one or two of scurvy or pellagra. Rickets is scarcely seen, the burning feet syndrome is very rare and nutritional ataxic paraplegia was only encountered twice. Only one case of ariboflavinosis

of local origin was seen, despite a careful watch kept since 1942. No scrotal dermatitis was seen.

The author suggests that the rarity of the signs of ariboflavinosis in his part of Assam may explain why kwashiorkor has not yet been observed: yet, on the other hand, it has not been reported from South India either, where angular stomatitis and superficial keratitis are common.

Four clinical cases are described, at length; for details of the comparative features, the original paper should be consulted. All the patients were females, three of them varying in age between 1½ and 7 years, and the fourth being about 30. Two of them were admitted for dysenteric symptoms and oedema, one for general debility, and one for night-blindness and corneal ulceration. All of them died within 2 to 7 weeks of admission, death in two cases being unexpected and fairly sudden.

Investigation was not complete, through lack of some facilities, particularly autopsies: but the author produces much evidence to claim that most of the diagnostic criteria of kwashiorkor were fulfilled. All the patients showed loss of weight, oedema, crazy-pavement dermatosis and diarrhoea: two had angular stomatitis, and a third showed some evidence of riboflavin deficiency; the mortality was high, and the characteristic rather sudden form of death described by Hughes was noted.

The author doubts whether riboflavin deficiency plays a prominent part in the syndrome: he inclines more to the view of Williams and of Trowell and Muwazi that a complex deficiency is present, or that a conditioned toxaemia operates, having either a dietetic or an infective origin: such a toxaemia would be aggravated by an associated vitamin deficiency and hypoproteinaemia.

[This is a useful contribution to the study of a syndrome which, so long as its exact aetiology remains undetermined, will involve the careful examination and sifting of obscure or complicated cases of dietary deficiency.]

H. J. O'D. Burke-Gaffney.

McFadzean, A. J. S. **Dermatitis as a Monosymptomatic Manifestation of Nicotinic Acid Deficiency.** *Glasgow Med. J.* 1947, Apr., v. 28, No. 4, 103–15, 1 fig. [27 refs.]

The majority of writers on nicotinic acid deficiency have recorded the appearance of general and oral manifestations before the appearance of skin lesions. Major McFadzean describes 62 cases in which characteristic pellagrous dermatitis was the only symptom or sign.

The dermatitis was readily preventable or curable by adequate dosage of nicotinic acid and could be reproduced experimentally by exposure to sunlight or ultra-violet radiation. In one case, typical oral lesions were produced by deliberate irritation of mouth and tongue.

The patients, Europeans in the Middle East, had for many months eaten an unusually non-irritating diet which yielded 11 to 13 mgm. of nicotinic acid daily, an intake theoretically just adequate by generally accepted standards.

[This work confirms that in mild degrees of nicotinic acid deficiency the site of the first *clinically detectable* lesion may be determined by local irritation. The statement that "in the absence of this [local irritation] no lesion developed" is not easy to accept as it stands: there can be little doubt that many biochemical lesions are present before the appearance of symptoms or clinical signs.]

Dean A. Smith.

Handler, P. **Metabolic Complexities of Pellagra.** *J. Lab. & Clin. Med.* 1947, Apr., v. 32, No. 4, 428–36. [60 refs.]

SPRUE.

JONES, E., WARDEN, H. F. & DARBY, W. J. **Evidence for the Activity of a Second Member of the Vitamin M Group (Fermentation Factor) in Sprue. A Case Report.** *J. Lab. & Clin. Med.* 1947, Apr., v. 32, No. 4, 387–91, 1 fig. [19 refs.]

" A patient with sprue was treated intramuscularly twice daily with 5 mg. of fermentation factor (pteroyldiglutamylglutamic acid). A total quantity of 83 mg. was given over a period of nine days. A maximum reticulocytosis of 38 per cent. occurred on the fourth day of therapy. This was accompanied by a rise in erythrocyte count and hemoglobin and clinical improvement.

" These results furnish additional evidence of the activity of this member of the vitamin M group in man and of the correctness of the hypothesis that the experimental analogue of sprue is vitamin M deficiency in the monkey."

DAVIDSON, L. S. P., GIRDWOOD, R. H. & INNES, Elizabeth M. **Folic Acid in the Treatment of the Sprue Syndrome.** *Lancet.* 1947, Apr. 19, 511–15.

The present report is primarily concerned with the haematological changes in 10 cases of the sprue syndrome after treatment with synthetic folic acid.

A short account of the effects of treatment on the clinical features and the absorption of fat is also appended. Of the cases included, four were classified as examples of tropical sprue, three as idiopathic steatorrhoea and three as coeliac disease.

The data set forth in two tables indicate that folic acid is a reliable therapeutic agent for the alleviation of certain clinical features of the sprue syndrome in adults. With the exception of one case, which was reserved for special haematological studies, all showed excellent clinical response. Diarrhoea was completely controlled within a few days and all noted a rapid improvement of the appetite and a sense of well-being. In contrast to these satisfactory effects in adults were the unsatisfactory results in the patients suffering from coeliac disease. Fat-balance tests were carried out in seven of the patients before folic acid treatment. In all, the test showed a failure of fat-absorption as compared with controls. Only in one did treatment improve fat-absorption as assessed by this test, and there appeared to be no correlation between improvement or the reverse in fat-balance tests and improvement or otherwise in the clinical or haematological results of treatment.

There now appears to be sufficient evidence to indicate that with a severe anaemia (erythrocyte count below 2,000,000 per cmm.) in adults, the blood picture is macrocytic and the bone marrow megaloblastic, and this appears to be true also in some patients with coeliac disease.

During the past year, the authors have investigated 33 adults with the sprue syndrome. The anaemia was usually moderate (mean red-cell count about 4,000,000 per cmm.). The blood picture was macrocytic, the colour-index and mean corpuscular volume high, and the bone marrow was normoblastic. The degree of macrocytosis in the sprue syndrome when the red-cell count is 4,000,000 to 5,000,000 is striking and differs from the picture in pernicious anaemia in patients who have received adequate liver therapy ; the authors have found that the anaemia of the sprue syndrome is particularly resistant to all forms of treatment. The hope that folic acid would provide an answer has not been fulfilled, judging by the unsatisfactory haematological responses in 9 out of the 10 patients whose records are reported in this paper. It is suggested that some other unidentified haematinic factor is required which may be present in liver ; this was suggested in one case which responded favourably after 14 days' treatment with proteolysed liver (Hepamino).

These results are in striking contrast to those of SPIES *et al.* [this *Bulletin*, 1946, v. 43, 769] and of GARCIA LOPEZ [*ibid.*, 1947, v. 44, 456] in tropical sprue in Cuba. These workers laid down the definite criterion that only those patients should be selected in whom the marrow was megaloblastic ; but in only one of the present series was this fulfilled and in that one the most satisfactory response was obtained.

Tentatively, the authors put forward the hypothesis that in idiopathic steatorrhoea and coeliac disease in Britain the steatorrhoea is not primarily due to dietary deficiency or infection, but results from a constitutional abnormality of the bowel. This belief is strengthened by the familial history of steatorrhoea in some patients. To account for the fact that the syndrome may display itself in infancy or in adult life, they stipulate that there are modifying genes and special environmental factors which determine the ultimate onset.

There are reasons for believing that folic acid will give dramatic results in the treatment of megaloblastic anaemia of the sprue syndrome, but there is little evidence that it will of itself restore the red cells qualitatively and quantitatively to complete normality. *P. Manson-Bahr.*

DAVIDSON, L. S. P. & GIRDWOOD, R. H. **Folic Acid as a Therapeutic Agent.** *Brit. Med. J.* 1947, May 3, 587–91, 1 graph. [16 refs.]

BRITISH MED. J. 1947, May 3, 604–5. **Folic Acid.** [14 refs.]

It has been demonstrated in animals that a deficiency of folic acid, however induced, results in a profound depressing effect on the production of red cells, leucocytes and platelets. The present paper records the results of the treatment of 48 patients suffering from a variety of disorders of the blood and alimentary tract.

Sixteen cases of pernicious anaemia treated with folic acid given in various amounts and by different routes are recorded. Effective haemopoietic response was obtained from the daily oral administration of folic acid in doses of 2·5 mgm. in four, 5 mgm. in two, 10 mgm. in three, and 20 mgm. in one. It is clear that folic acid alone, in 5 mgm. doses, can restore the blood level to normal. In one case, daily intravenous doses of 1 mgm. for 14 days resulted in a marked fall, necessitating blood transfusion, but a subsequent response was obtained with 5 mgm. intravenously. Large single doses, 200 mgm. folic acid intramuscularly and 400 mgm. orally, to two patients produced no side effects and resulted in excellent haematological responses which lasted 14 days. Large single doses are wasteful, however, since more satisfactory results are obtained with the same quantity given in daily doses of 5–10 mgm.

Folic acid did not produce reactions in four patients who were sensitive to parenteral liver therapy.

In one case, severe agranulocytosis developed during treatment with folic acid. The febrile reaction responded to penicillin therapy and the leucocytes started to rise after 150 mgm. pyridoxine daily by mouth, but three days afterwards multiple peripheral neuritis ensued—eventually the patient recovered.

No successful results were obtained in three cases of subacute combined degeneration of the cord. In five cases of refractory megaloblastic anaemia which had resisted large doses of anahaemin the responses were considered satisfactory. In one, a woman of 70, whose blood findings were typical of pernicious anaemia, the bone marrow was changed to the normoblastic state.

In aplastic anaemia, leucopenia and thrombocytopenia no therapeutic benefit occurred, either in those cases whose causation could not be determined or those arising secondary to some recognizable cause.

The effects on the sprue syndrome are similar to those already published [see this *Bulletin*, 1947, v. 44, 342 and above].

In 5 cases of ulcerative colitis, folic acid in doses of 60 mgm. daily for 6–11 days produced no significant results.

These observations reinforce those of other workers—namely that a haematological response to folic acid will be obtained only in megaloblastic forms of anaemia.

When leucopenia and thrombocytopenia are part of a nutritional syndrome resulting from a deficiency of folic acid, an increase of leucocytes and thrombocytes will result from folic acid treatment; but when anaemia is of the normoblastic type and when leucopenia and thrombocytopenia result from other than specific nutritional deficiency folic acid is ineffective.

There appears to be little doubt that free folic acid (pteroyl-glutamic acid) is the factor essential for the continuation of normoblastic blood formation and a deficiency causes a reversion of the bone marrow to the megaloblastic state. When free folic acid is given in pernicious anaemia, a transformation of the megaloblastic bone marrow occurs together with a marked increase of free folic acid in the urine, but with conjugated folic acid (pteroyl-heptaglutamic acid) as contained in yeast, no such transformation takes place. But when purified liver extract is given parenterally in pernicious anaemia, the classical haemopoietic response occurs together with a marked excretion of free folic acid. Hence it is assumed that purified liver extracts contain a factor which enables the conversion of conjugated folic acid to free folic acid to take place.

This liberating factor, which is the product derived from the interaction of Castle's intrinsic and extrinsic factors in the alimentary tract, is absorbed from the intestine and stored in the liver. It is present in that of normal persons, but absent in patients with pernicious anaemia. This liberating factor is referred to as L.F. The cause of pernicious anaemia lies in the inability of the body to convert conjugated folic acid to the free form through lack of L.F.

Folic acid is a vitamin of the B_2 complex and may be expected to conform to the general principles governing vitamin therapy, which are :—

(1) A beneficial result will occur only if the body is deficient in the vitamin.

(2) When a person has a sufficiency of a vitamin the giving of excessive amounts is valueless and wasteful.

(3) In a vitamin deficiency disease, replacement therapy produces a therapeutic result rapidly.

It is believed that the daily requirement of folic acid lies between 0·5 and 1 mgm.

There is evidence for the belief that for the treatment of any megaloblastic anaemia, quantities of folic acid in excess of 10 mgm. daily are unnecessary and wasteful and, if haematological and clinical improvement does not occur within two weeks, it can be assumed that the disorder is not due to deficiency of folic acid and that continued administration is contraindicated. *P. Manson-Bahr.*

MORRISON, R. J. G. & JOHNSTON, C. R. St. **Treatment of Tropical Sprue with Folic Acid.** *Lancet.* 1947, May 10, 636–7.

Four cases of tropical sprue treated with synthetic folic acid are described. The first two, previously untreated, showed a dramatic response. In one the blood count was not satisfactory, in spite of the physical improvement. Free acid had returned to the gastric juice.

In the second case, the patient had gained over 13 lb. at the end of the first week, and on the 37th day of treatment the haemoglobin was 95 per cent. and the red cells 4,200,000. The dose of folic acid was then reduced from 20 mgm.

to 10 mgm. daily and on the sixtieth day to 5 mgm. A fractional test-meal after treatment still showed achlorhydria.

The response of the last two was unsatisfactory. Both had received other treatment for some time. One was a longstanding case. The blood picture did not improve, though the fat-content of the fæces dropped from 27 to 12 per cent. The other, in a nursing sister, was of recent onset. Even on 100 mgm. of folic acid daily, no reticulocyte peak occurred, and no change either in haemoglobin or total red-cell count. *P. Manson-Bahr.*

HAEMATOLOGY.

Proc. Roy. Soc. Med. 1946, Sept., v. 39, No. 11, 755–62 (Sect. Exper. Med. & Therap. 29–36, 7 figs., 22 refs.) **Discussion on the Life and Death of the Red Blood Corpuscle** [Callender, Sheila T.; Lovell, J. F.; Jope, E. M.].

Sheila T. Callender, by bleeding and transfusion of healthy male volunteers, found that the average life of transfused red cells was about 60 days and that their rate of destruction was 0·83 per cent. of the initial amount per day, which, since transfused cells are of all ages, gives a value of 120 days for the normal life of a red cell. Experiments in women presented a slightly different problem. At each menstrual period a fraction of the cells transfused is lost and the graph of survival of transfused cells, instead of being practically linear as in men, should show periodic steps. The menstrual loss is, however, insufficient to give a definite step, but it produces a curvature in the graph. From the difference in the graphs for males and females, the calculated menstrual loss appears about 300 to 400 cc. per period. This seems large, but the method of calculation is relatively inaccurate. Further studies are necessary, however, as there may be an additional destructive factor, possibly one related to ovarian secretion.

J. F. Lovell observed that normal cells transfused into patients with hypochromic anæmia had only a slightly diminished life of about 100 days and that the survival of normal cells transfused into patients with treated Addisonian anæmia was also not grossly abnormal. On the other hand, cells from untreated cases of pernicious anæmia transfused into convalescent subjects with mild hypochromic anæmia were rapidly destroyed. If the same destruction occurs in the persons from whom the blood was drawn, then active haemolysis does occur in pernicious anæmia and no other explanation is needed for the haemosiderosis and the hyperbilirubinæmia. The life of cells transfused into patients with acquired acholuric jaundice was in all cases grossly diminished, and splenectomy did not greatly alter the mean length of survival. The survival of cells from cases of acquired acholuric jaundice transfused into normal persons was substantially normal. This suggested therefore, that in acquired acholuric jaundice there is a circulating haemolysin, which destroys transfused red cells as well as the patient's own red cells. In congenital acholuric jaundice, there is an inborn defect of the red cells, shown in their diminished survival when they are transfused into normal circulation, while normal cells transfused into patients suffering from congenital acholuric jaundice have a normal survival.

E. M. Jope stated that whereas methaemoglobin disappears rapidly from blood after the causative agent has been removed, sulphaemoglobin persists in circulating or in drawn blood for many weeks. It appears that the body has no means of removing sulphaemoglobin other than by destruction of the red cells

that contain it. Assuming that the formation of sulphaemoglobin within the red cell did not alter its life, the disappearance of sulphaemoglobin from the circulating blood was used to measure red cell survival. By this method, the average life span of the red cells appeared to be in close agreement with that obtained by the methods already discussed. A similar length of survival has been obtained by studying the incorporation of the N^{15} isotope, from ingested glycine, into the protoporphyrin of haemoglobin, and its subsequent disappearance. *F. Murgatroyd.*

HYNES, M., ISHAQ, M., MORRIS, T. L. & VERMA, O. P. **Anaemia and Malnutrition in Indian Army Recruits.** *Indian J. Med. Res.* 1946, May, v. 34, No. 1, 119–29.

Eight hundred and one Indian Army recruits, mostly Tamils and Telegus from Eastern Madras and Malayalis from the south-west coast, and belonging to the agricultural and labouring classes, were examined. The economic status of the men had been very low, rice had been their staple food and they had taken very little animal protein and very little fat.

The degree of muscular development, amount of subcutaneous fat and signs of vitamin deficiency were used in assessing malnutrition. Two-thirds of the recruits had moderately good muscular development and of these 20 per cent. had less than 14 gm. haemoglobin per 100 cc. blood, and 53 per cent. had 15 gm. or over. There was almost twice as much anaemia amongst the remaining one-third whose muscle development was poor, 37 per cent. having less than 14 gm. Hb per 100 ml. blood while only 37 per cent, had 15 gm. or over. Anaemia was less common in men with poor subcutaneous fat and most common in those with good subcutaneous fat ; eight out of sixteen in the latter group had less than 14 gm. haemoglobin per 100 ml. and only three had 15 gm. or over. It was assumed that the amount of subcutaneous fat was determined by the calorie intake, whereas the muscular development was dependent upon both calories and protein. Anaemia showed a clear correlation between ocular and cutaneous signs assumed to be due to vitamin deficiency, but some of the skin lesions may in fact have represented protein deficiency. In the more malnourished men, hookworm infestation progressively added to the degree of anaemia, but no correlation could be demonstrated in the better nourished men, which suggests that blood loss associated with hookworm infestation is readily borne if the diet is adequate. A clear correlation between anaemia and slight splenomegaly suggested that malaria plays a part in the production of this anaemia of malnutrition. The majority of the anaemias were normocytic and normochromic, but iron deficiency was clearly evident in the severer anaemias and probably in most of the milder anaemias ; macrocytic anaemia was rare.

F. Murgatroyd.

HYNES, M., ISHAQ, M. & VERMA, O. P. **The Effect of Different Diets and of Iron Medication on the Nutritional Anaemia of Indian Army Recruits.** *Indian J. Med. Res.* 1946, Oct., v. 34, No. 2, 273–88, 3 graphs.

The haematological response of some 800 Indian Army recruits [see HYNES *et al.* above] to various diets and iron medication during their first six months of training was determined. The men were divided into various groups ; Group A receiving 6 grains of ferrous sulphate daily for the first four months of their training, Group B serving as controls, and Group C receiving 3 grains of ferrous sulphate daily for the four months. Groups A and B were also sub-divided each into sections. The first section of each received the Indian Army standard diet, the second section approximately the same diet with a daily addition of 8 oz. of

meat, and the third section a lacto-vegetarian diet in which the meat of the standard ration was replaced by tinned milk equivalent to 48 oz. of fresh milk daily; the two modified diets had approximately an equal animal-protein content.

The experiment showed that the anaemia was cured by an adequate diet quickly if a little ferrous sulphate was given for a few weeks, and more slowly without the iron. Even severe grades of anaemia were completely cured by a daily dose of 3 grains of ferrous sulphate for four months; 6 grains daily for two months did not cure the severe anaemia and 6 grains daily for four months had no advantage over the 3 grain dosage. There was little difference in the haematinic value of the three diets, but the diet in which the meat was replaced by a very generous amount of tinned milk proved the least effective, and the diet with the extra meat proved the most effective. It is possible that the high calcium content of the milk diet impaired the iron absorption; it has also been shown that in grossly protein-deficient anaemic dogs, milk compared badly with meat in haematinic value. Hookworm infestation was found to be of no importance when the recruits were put on an adequate diet; the preliminary survey showed that it was only in the more under-nourished recruits that this infection was correlated with anaemia. Malaria, septic conditions and acute tonsillitis were found to be important conditions having an adverse effect on haemoglobin regeneration. *F. Murgatroyd.*

RIETTI, F. **Hemolytic Anemias with increased Osmotic Resistance of the Erythrocytes.** *Acta Med. Scandinavica.* 1946, Sept. 20, v. 125, No. 5, 451–64. [74 refs.]

Although it is generally assumed that in haemolytic anaemias the erythrocytes show an increased fragility to hypotonic saline solution, many examples have been recorded where the resistance is normal. In Cooley's anaemia, the resistance of the cells to haemolysis is often greatly increased, and in sickle cell anaemia there may be an increased resistance. The present paper deals with a newly-described type of haemolytic anaemia in which the erythrocyte resistance was also increased. The clinical features were a familial hypochromic haemolytic anaemia with microcytosis, poikilocytosis or ovalocytosis and stippling of the red cells, the degree of poikilocytosis and hypochromia being out of proportion to the anaemia, which was generally not pronounced. Slight jaundice, at least from time to time, was generally present, although the patients were more anaemic than icteric. The spleen and liver were enlarged. Increased blood destruction and regeneration were demonstrable without true haemolytic crises. Bone changes, generally osteoporotic, were common. No evidence of syphilis was obtained.

Hyperhaemolysis and impairment of the osmotic resistance of the erythrocytes are obviously not necessarily equivalent. The author points out that it has been demonstrated that the plasma of patients suffering from haemolytic anaemia with increased resistance of the red cells is capable of reducing the resistance of red cells of healthy individuals of the same age and blood group, and he suggests that attention should be directed to the binding between haemoglobin and stroma. *F. Murgatroyd.*

DAS GUPTA, C. R. & CHATTERJEA, J. B. **The Rôle of Synthetic Folic Acid (*L. casei* Factor) in the Treatment of Nutritional Macrocytic Anaemia.** *Indian Med. Gaz.* 1946, Oct., v. 81, No. 10, 402–10, 8 graphs. [21 refs.]

Of eight patients with nutritional macrocytic anaemia treated with folic acid, seven improved appreciably and one slightly. The improvement in all

patients was preceded by reticulocytosis but there appeared to be little correlation between the degree of reticulocytosis and the rate of improvement. In most cases, the improvement was not associated with an immediate lowering of the mean corpuscular volume which remained slightly increased even up to the end of treatment. In four patients who were given liver after folic acid, the administration of liver resulted in a further improvement in the haemoglobin and red cell count and also in a lowering of the mean corpuscular volume. Folic acid given continuously in doses of 20–30 mgm. a day for 30 days produced a greater improvement than when given interruptedly even in large doses of 100 mgm. a day for the first week or two, although the total amount during the month in the latter method was greater. The best response with folic acid occurred in cases where immature cells of the red cell series formed more than 50 per cent. of the total nucleated cells of the bone marrow, and a better response was generally noted where the bone marrow showed a fair amount of normoblastic erythropoiesis than in cases where the reaction was predominantly megaloblastic. Patients with achlorhydria generally did not appear to respond as well as those secreting even only a small amount of acid. The improvement with folic acid did not appear to bear any relation to the previous dietetic habits of the patients, provided they had adequate calories during treatment, and it did not appear to be influenced by the protein intake provided this was not below the physiological minimum during treatment. Associated infections, such as syphilis, amoebiasis, ankylostomiasis and ascariasis did not appreciably impede the rate of improvement. After treatment with folic acid most of the patients showed an increase in the white cell count, but whether this was due to direct action of the drug on the leucopoietic tissue or due to increased vascularity of the marrow following the improvement in the anaemia, was not determined. *F. Murgatroyd.*

FROMMEYER, W. B., Jr. & SPIES, T. D. **Relative Clinical and Hematologic Effects of Concentrated Liver Extract, Synthetic Folic Acid and Synthetic 5-Methyl Uracil in the Treatment of Macrocytic Anemias in Relapse.** *Amer. J. Med. Sci.* 1947, Feb., v. 213, No. 2, 135–49, 4 figs. [15 refs.]

Comparative studies of macrocytic anaemias associated with pernicious anaemia, nutritional deficiency, and tropical sprue, treated with concentrated liver extract, folic acid, and 5-methyl uracil, showed that the reticulocyte peak was highest with the liver extract and lowest with the 5-methyl uracil. Differences in the rate of red cell increases were also evident. In one patient treated with liver extract, there was an increase in the erythrocytes of 3·69 million per cmm. of blood in approximately two months; with synthetic folic acid the increase was 3·33 million while with synthetic 5-methyl uracil an increase of only 0·53 million occurred in 21 days and after two months the patient had already relapsed. In a second patient, the reticulocyte response to folic acid was tremendous, but the rate of red cell increase was definitely lower than it was following liver extract. Liver administered for 15 days produced an increase in red cells of 4·92 million within two months, with folic acid the increase was only 2·35 million and a count of 4 million was never reached, while with 5-methyl uracil the reticulocyte response and red cell increase were lower than with either of the other two substances. Similar responses were obtained in other patients.

With 5-methyl uracil there was also a definite delay in the onset of patients' subjective improvement which usually occurred some 3–5 days later than it did with either folic acid or liver extract. Glossitis was more consistently relieved by liver extract and by folic acid than by 5-methyl uracil; in several patients treated with the last-named substance the glossitis remained unchanged.

Symptoms referable to paraesthesiae were much more often relieved by concentrated liver extract than by folic acid.

The observations support the current idea that liver contains multiple anti-anaemic substances. There is not enough folic acid in concentrated liver extract to account for the activity of the latter and there is obviously not enough 5 methyl uracil. Methyl uracil may be converted into folic acid, possibly in the intestinal tract, and in this manner cause maturation of the red cells. It seems, however, that the active principle in liver extract is not folic acid but some other powerful substance. Although folic acid is inferior to liver extract it is of special value where there is sensitivity to liver. *F. Murgatroyd.*

VILTER, C. F., VILTER, R. W. & SPIES, T. D. **The Treatment of Pernicious and Related Anemias with Synthetic Folic Acid. I. Observations on the Maintenance of a Normal Hematologic Status and on the Occurrence of Combined System Disease at the End of One Year.** *J. Lab. & Clin. Med.* 1947, Mar., v. 32, No. 3, 262–73, 3 figs. [16 refs.]

Twenty-one patients with pernicious anaemia, treated with folic acid by mouth in doses of 10 to 15 mgm. daily, or 30 mgm. thrice weekly, suffered no apparent haematological relapse during the period of observation of over a year. Evidence was also obtained that a satisfactory haematological condition could be maintained similarly in patients with sprue or nutritional macrocytic anaemia. Three other patients with pernicious anaemia gave a similar haematological response but they required increased amounts of folic acid.

Four of the patients, however, with pernicious anaemia, after five months of folic acid therapy, developed numbness and tinglings in the hands and feet, unsteadiness of gait, and some stiffness in the limbs. Neurological signs appeared and progressed until there was clear evidence, including positive Rombergism and extensor plantar responses, of subacute combined disease. This condition failed to respond to large doses of folic acid, 50 to 500 mgm. by mouth daily for 10–14 days, but improved within ten days of giving refined liver extract intramuscularly. It is suggested, therefore, that there is an unknown factor in liver, other than folic acid, which is essential for maintaining the integrity of the nervous system in patients with pernicious anaemia, and that folic acid alone cannot be considered adequate treatment for pernicious anaemia.

F. Murgatroyd.

ROBERTSON, W. M. & FINDLAY, G. M. **Sickle-Cell Anaemia in West Africa.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1947, Mar., v. 40, No. 4, 435–46. [13 refs.]

Sicklaemia was found in 12·4 per cent. of African soldiers, and acute sickling crises occurred in about 0·6 per cent. of those with the sickling trait.

During the latent phases, patients have no symptoms excepting occasional joint pains. Crises, which often arise during the course of some serious infection or other disease, are manifested by pains in the joints, in the abdomen, especially over the spleen, and sometimes in the chest, presumably due to small thromboses and infarcts. The crises are characterized by a great reduction in the red cell count, the appearance of normoblasts in the peripheral blood, reticulocytosis, leucocytosis, hyperbilirubinaemia and sometimes clinical jaundice. Occasionally cell destruction is sufficient for the amount of liberated haemoglobin to reach the renal threshold and for haemoglobinuria to result. Crises are common during pregnancy, and sometimes lead to foetal death ; while in cases where the pregnancy goes to term the child appears to be more liable to sudden death within a few days of birth.

So protean are the symptoms of sickle-cell disease that tests for sickling should be made in all Africans showing anaemia or having any obscure disease. During a haemolytic crisis, blood transfusions are of primary therapeutic importance. *F. Murgatroyd.*

TROPICAL ULCER.

DENHOFF, E. & KOLODNY, M. H. **Cutaneous Diphtheria and Tropical Ulcer.** *Arch. Dermat. & Syph.* 1947, Mar., v. 55, No. 3, 360–68.

The authors studied the bacteriological flora of tropical and other ulcers in 56 patients, and examined the results of four distinct forms of treatment.

The lesions were classified as tropical ulcer (19 patients); eczematoid dermatitis (15); atypical lichen planus (7); and other forms of dermatitis (15). Most of them were a month or more old and had had various forms of previous treatment.

Among the 56 patients, 8 virulent and 30 avirulent strains of *C. diphtheriae* were found. Organisms were also found in the faeces of one of the former patients and 14 of the latter. Diphtheroids were isolated in 13 cases. Among the 19 tropical ulcers, virulent diphtheria bacilli were found in 3 and avirulent in 10. All patients having virulent diphtheria organisms in the skin lesions were Schick negative: in those having avirulent or no diphtheria organisms, Schick reactions were positive in comparable numbers. It is noteworthy that in 2 cases where only avirulent organisms were found, a peripheral polyneuritis developed, suggesting the previous presence of virulent organisms. Haemolytic staphylococci were isolated from almost every case: in about 10 per cent., haemolytic streptococci were found; and occasional strains of *Proteus vulgaris* and *Ps. pyocyanea* were isolated. In no case was there any evidence of fuso-spirochaetosis, nor signs of mycosis, leishmaniasis, inadequately treated syphilis or sickle cell anaemia.

The four plans of treatment were :—

(1) (Controls): dressings of isotonic saline.

(2) Identical with (1) except that the dressings were kept wet for two hours three times a day with sodium penicillin (250 units per cc.) in isotonic saline.

(3) Identical with (1) with the addition of intramuscular penicillin in doses of 20,000 units every 3 hours for 72 hours (total 480,000).

(4) Combined plans (2) and (3).

The results are shown in three tables in the text; it is evident, on the criteria of disappearance of pathogenic flora and the healing of the ulcers, that penicillin locally (plan 2) and penicillin locally and parenterally (plan 4) gave the highest percentage of successful results, namely 91 and 92 per cent. respectively. Saline dressings alone and together with parenteral penicillin produced 30 and 56 per cent. successes respectively.

With the most successful methods recorded above, pathogenic organisms were eliminated in an average of 4 days, and the bases of the ulcers showed healthy granulation in 3 to 4 days.

No significant scarring occurred where the ulcers were superimposed on a dermatitis, but in tropical ulcers a thin atrophic scar remained: none broke down under normal activity and there were no recurrences after 30 days.

Penicillin sensitivity took the following forms: contact dermatitis (4 patients, all previously treated with local penicillin); exacerbation of pre-existing dermatitis following initiation of parenteral penicillin (4 patients); a generalized erythematous maculopapular rash (1); delayed reactions to

parenteral penicillin (3); urticaria (2); serum sickness-like syndrome (1). [This represents more than 25 per cent. sensitivity, a frequency which would detract from the value of the treatment: it is to be regretted that there is no record of patch tests, which would have indicated whether these results were in fact due to penicillin.] The authors are careful to point out that whilst local penicillin was evidently the treatment of choice, it cannot be expected by itself to produce satisfactory healing: it should be accompanied by rest in bed, regular cleansing, débridement, careful dressings and good nursing.

[Whilst the satisfactory results recorded in this interesting paper are beyond question, the title is somewhat misleading. In the text, the authors refer to "56 patients with tropical ulcers or ulcerated dermatitides": in a table, these are divided into four groups of lesions, not necessarily aetiologically related, and of which only one-third are described as "tropical ulcer".

The aetiology and clinical conceptions of "tropical ulcer" are subject to so much uncertainty that it is essential, in dealing with this condition, to begin by defining it; and then to describe the lesions encountered in terms of that definition. No such definition or descriptions are given in the paper: in their absence, in the failure to find fusospirochaetal organisms, and in the prevalence of *C. diphtheriae*, it is difficult to ascertain on what grounds a diagnosis of "tropical ulcer" has been made: indeed, the information provided suggests that the lesion so described may well be a veldt sore, a condition usually accepted as a separate entity and references in the text to other work serve to strengthen this belief.

Unanimity on what constitutes "tropical ulcer" is desirable, if such strikingly successful claims are to be established in respect of a condition hitherto so refractory to specific treatment.] *H. J. O'D. Burke-Gaffney.*

MISCELLANEOUS DISEASES.

KERSHAW, G. R. **Acute Non-Specific Diarrhoea and Dysentery. Local Chilling of the Abdomen as a Causative Factor.** *Brit. Med. J.* 1947. May 24, 717–19. [17 refs.]

Acute enteritis of unknown origin is common in Europeans on visiting or living in hot climates. It is important on account of its power of causing temporary prostration.

It is well known that chilling of the abdomen by rapid ingestion of cold fluid in large quantities when the body is heated induces diarrhoea, and also that chilling of the abdominal wall does likewise. Other methods of inducing diarrhoea are taking of quantities of ice-cream, or sitting in a wet bathing costume whilst sun-bathing.

Observations made on H.M. ships during the recent war provide further testimony that this form of diarrhoea was extremely prevalent in the tropics. The patient would be wakened shortly after midnight with generalized abdominal colic and an urgent call to defaecate; vomiting was rare and tenesmus absent. In severe cases, colic persisted until mucus was passed; sometimes the stools were blood-stained. Recovery was spontaneous and complete.

For this incidence, the plenum system of ventilation was held responsible; ratings who slept in hammocks suffered more frequently, earlier, and more severely than those who slept in camp beds. The effects of the author's investigations carry conviction that chilling of the abdominal wall is a common cause of non-specific enteritis afloat and ashore in all climates, but particularly

in hot ones. Persons entering hot climates suddenly should make the change from thick to thin clothing gradual. As a prophylactic measure a bush-shirt, or a loose-fitting shirt with cellular undervest should be worn. A change to thicker clothes should be made before sundown. An undervest should be worn, especially in spring and autumn, in windy or humid weather.

The plenum system as arranged in living spaces for daytime usage is unsuitable for the ventilation of sleeping accommodation where hammocks or tier bunks are employed. By night a cholera belt or a blanket folded across the abdomen should be worn. *P. Manson-Bahr.*

JETTMAR, H. M. Persönliche Erfahrungen ueber einige Seuchen Chinas. [**Personal Experiences of some Epidemics in China.**] *Wien. klin. Woch.* 1947, Jan. 24 & Feb. 7, v. 59, Nos. 3 & 5, 33–6; 65–7, 1 map. [Numerous refs.]

The author has selected for description human plague, typhus, leprosy, amoebic dysentery and cholera, and adds some remarks on relapsing fever, malaria and goitre. He intentionally omits smallpox, cerebrospinal fever, bacillary dysentery and the helminthiases.

Bubonic plague exists, he says, in four or five grouped foci: (1) A northern focus in Mongolia and Manchuria. (2) A sub-Manchurian focus west of Mukden. (3) One in the provinces of Shansi, Shensi and Ordos. (4) In west Yunnan, and (5) A coastal focus with Fukien as its centre and extending southward to Kwangtung and Hainan. These are all well shown in a spot-map. Most cases are bubonic, but occasionally the pneumonic type is seen. In the north, the marmot, tarabagan, and its fleas are the carriers; in the others, chiefly rats, for the dwellings in the Fukien province are of stone in the south, of wood in the north, and the dirt and rubbish within and without them afford good harbourage for the nesting and breeding of rats.

Typhus occurs in the northern province of Kansu and especially in the town of Lantschou, and, more to the south, in the province of Kweichow. The former is louse-borne and the fatality is high; the latter is of the murine type and usually runs a mild course, the exanthem may not appear at all and deaths are very rare. It differs seasonally from the murine type in other countries, dying down almost completely in the warmer months. Sera of patients in Kweichow agglutinate *Proteus OX19* in high dilution, to 1 : 10,000; the *OXK* strain in low dilution, 1 : 80, occasionally 1 : 160. Kweiyang, the chief town of Kweichow province, has the reputation of being "the most rat-infested town in China," nearly all *Rattus norvegicus* (341 out of 349) caught. Of 908 fleas examined from these animals, 776 were Ceratophyllini, 24 were *Leptopsylla musculi* and 108 were *Xenopsylla cheopis*.

Leprosy is widespread. The author has little new to say of this; he suggests that small injuries from the wearing of rough straw sandals may be the sites of entry of infective material from the roads. He finds a formol-gel reaction, 0·05 cc. concentrated formalin to 2·0 cc. serum, a useful diagnostic aid. The gel differs from that of kala azar patients in remaining clear, but the test is of subsidiary value only since he finds it positive also "occasionally in chronic malaria patients and sometimes (*manchmal*) in other diseases."

Of the other diseases mentioned in this article the author gives quite good accounts, but has nothing fresh to offer. The southern provinces from Hunan to the coast may be said to be the home of *cholera* and "Shanghai is a cholera-endemic town." The infection is largely water-borne, because the water used for drinking, washing and cooking comes from streams polluted by dejecta; vegetables and garden produce fertilized by human excreta are another source of infection. *Amoebic dysentery* outbreaks are ascribed to latrine flies, especially

Chrysomyia megacephala. The same insect is held responsible for the summer diarrhoea of infants and for some of the cholera.

The author refers to the malaria outbreak in Nanking in the summer of 1930 and that in south-west Kweichow in 1940, probably carried by *A. minimus* and *A. hyrcanus*, and the latter was the vector in the Szechuan outbreaks of 1939 and 1941, associated with the drying of the rice-fields.

Lastly, *goitre.* The author found foci of this disease in Lupinshan hills, in Yunan, west of Kunming, in south-west Kweichow and in Tinlinshan. The people themselves ascribe the disease to the drinking water which has a low iodine content. *H. Harold Scott.*

TRAQUAIR, R. N. **Pyomyositis.** *J. Trop. Med. & Hyg.* 1947, May, v. 50, No. 5, 81–9, 3 figs. [37 refs.]

This condition is characterized by suppuration in the skeletal muscles, and the paper under review is based on observations on a series of 31 cases occurring in young adult males in the West African Army (*i.e.* a selected population) and treated in the Gold Coast. Although the disease has been described in Japan and Europe it is most commonly met with in the tropics. No age or sex is immune but it has been most frequently described in young adult males.

The author divides the lesions into three types :—

(i) Non-suppurative lesions only [can these strictly be called pyomyositis ?].

(ii) Suppurative lesions without recurrence.

(iii) Recurrent and repeated abscess formation, in some cases complicated by severe pyaemia with suppurative myositis.

Type (ii) was the commonest in this series (16 out of 31 cases).

A description is given of selected cases. One developed a purulent pericarditis 26 days after detection of an abscess in the left deltoid and after treatment with 48 gms. of sulphathiazole. 300 ml. of pus were aspirated from the pericardium, *Staph. pyogenes*, coagulase positive and penicillin sensitive was found on bacteriological examination ; this patient was successfully treated with 1,100,000 units of penicillin given intramuscularly over a period of 11 days.

Cultures were made from the pus of 19 of the 27 suppurative cases ; *Staph. pyogenes*, coagulase positive, was obtained in 18—the remaining specimen was sterile.

Biopsies from three non-suppurative cases were all sterile. Blood cultures were made in 11 cases and the staphylococcus obtained in 3.

Two types of case present difficulty in diagnosis : (i) those without local signs at onset—these may simulate any acute febrile disease. Discovery of leucocytosis is a help ; (ii) mild cases with insidious onset and a lesion in the shoulder or pelvic girdle, when it may be very difficult at first to find any physical signs. Systematic examination of joint movements is of value, as the affected muscle is very sensitive and resistant to stretching. Cases with localization in the ilio-psoas muscle may simulate some intra-abdominal disease, especially appendicitis in the case of a right-sided involvement.

Although a bacteriaemia is essential for development of a pyomyositis it is considered that some other factor is concerned—probably a vitamin deficiency, especially subclinical scurvy [the reviewer's experience in East Africa tends to confirm this]. Trauma may be an added factor, and also possibly filariasis from death of the adult worm in the muscle.

Treatment is fully described. The outlook has been greatly altered by the introduction of sulphathiazole and even more especially by penicillin, the latter obviously being the drug of choice. A single well-localized abscess may be opened without delay, but as a rule surgical treatment was not carried out until the infection was controlled by drug treatment.

Sulphathiazole was given by mouth, commencing with an initial dose of 3 gm., followed by 2 gm. every 4 hours, until the infection appeared to be under control. This drug should not be continued for more than seven days without a break—it may be resumed after a few days' interval. Leucocyte counts and daily examination of the urine were necessary. The largest dose of sulphathiazole in one course was 82 gm. the largest amount given to any one patient was 103 gm. plus 34 gm. of sulphadiazine.

Operation. All the abscesses should be opened at one sitting, a small incision only being required. An extensive search should always be made for pus which may be difficult to find, and if this is thin and only faintly turbid, the wound may be sutured at once. Should thick pus be found a corrugated rubber drain is put in for a few days.

In three cases only was penicillin available. One patient received 1,225,000 units intramuscularly in 10 days; a second 1,100,000 units in 11 days; the third received only 300,000 in 3 days, the drug being stopped as the organism was found to be insensitive.

[In one of these cases, complicated by a purulent pericarditis, the patient would almost certainly have died without penicillin.]

Compared with other series of cases reported, there appears to have been a great reduction in the number remaining in hospital for over 4 weeks. There were no deaths, although a mortality rate of close on 10 per cent. is usually given. [It must be remembered, however, that this series was composed of healthy young male adults *i.e.* a picked population.]

[An interesting paper, especially on the clinical side.] *C. F. Shelton.*

BURKITT, R. T. **Tropical Pyomyositis.** *J. Trop. Med. & Hyg.* 1947, Apr., v. 50, No. 4, 71–5. [13 refs.]

A series of 50 cases, treated in Nigeria, are reviewed and compared with 50 controls, examined in the hope of reaching some conclusion regarding aetiology. Detailed figures of sex or age incidence are not given.

The author considers that no single aetiological factor was established, and that there was insufficient evidence from the controls to incriminate filariasis, ancylostomiasis, avitaminosis or sickle-cell anaemia (17 patients showed microfilariae in the blood as compared with 5 among the controls. *A. perstans* was most commonly met with—11 cases out of 17). A definite history of trauma was given in 9 cases, and there did appear to be a definite association with general debility and a poor state of health. In only one case was septicaemia proved by blood culture [organism found not stated]. Pus was cultured in 40 of the cases and a *Staph. aureus* grown in 24, *Staph. albus* in 6, and 10 were sterile.

The author puts forward the following hypothesis, *viz.*, deep muscle abscesses in the tropics are caused primarily by a lowering of resistance of muscle tissue by one of several factors, this area becomes secondarily infected by pathogenic organisms already in the blood stream, the condition being especially frequent in those whose resistance has been lowered by chronic ill health. Septic lesions (especially of the feet) appear to be frequent foci of infection.

Diagnosis may be difficult, as the abscess may be too deep for fluctuation to be detected and a dark skin tends to mask discoloration. Only one case in this series was complicated by a pyogenic arthritis.

Nineteen cases showed more than one abscess (54 abscesses were found in 19 patients). Some may resolve without operation.

Penicillin was not available for treatment and the author did not find the sulphonamides of much value. Once the presence of pus was obvious, surgical treatment was found to bring immediate relief, the strongest indications of

pus formation are extreme tenderness and a high temperature. A small incision only is needed, the abscess being drained thereafter. Convalescence is usually rapid, with no permanent disability.

[See also TRAQUAIR, above.] *C. F. Shelton.*

VISWANATHAN, R. **Post-Mortem Appearances in Tropical Eosinophilia.** *J. Trop. Med. & Hyg.* 1947, May, v. 50, No. 5, 93–5, 2 figs. Also in *Indian Med. Gaz.* 1947, Feb., v. 82, No. 2, 49–50, 2 figs. on 1 pl.

An Indian soldier of 28, who had been suffering from breathlessness and asthmatic attacks for 6 months, was diagnosed as suffering from tropical eosinophilia : his total leucocyte count was 28,000 per cmm., with 44 per cent. eosinophiles. He received two injections of N.A.B. 0·3 gm. at a week's interval : twenty-four hours after the second one, he developed signs suggesting arsenical encephalopathy and he died 36 hours later ; just before death, his leucocytes were reduced to 21,000 per cmm. and eosinophiles to 7 per cent.

At autopsy, punctate haemorrhages were seen in the brain and mesentery.

In the lungs, the principal feature was the presence of dark reddish brown areas, varying in size from " that of a split pea to that of a rupee " : some resembled the early stage of infection. The bronchioles were very congested and contained blood-stained muco-purulent secretion.

Microscopically, the lungs showed several areas of interstitial fibroblastic proliferation, with alveoli containing macrophages and phagocytic monocytes. Most of these cells contained eosinophilic granules, and eosinophilic leucocytes were also prominent in the interalveolar spaces. The partly consolidated areas were closely related to the terminal bronchioles. In some alveoli, very large giant-cells, composed of fused mononuclear cells, were seen. The nuclei were centrally gathered in numbers of from 15 to 25. In some areas, a characteristic form of nodule was noted : this consisted of 4 or 5 giant cells, surrounded by a cluster of mononuclear cells, and quite unlike those seen in tuberculosis. The relation of the pathological process to the bronchioles suggests a bronchogenic origin, and it is also suggested that areas of cellular infiltration and the nodules explain the mottled shadows seen in radiographs of cases of tropical eosinophilia. The interstitial nature of the changes suggests chronicity. The histological features are illustrated in two photomicrographs. Sections of the brain showed congestion and some perivascular collections of mononuclear cells : injection of 2 guineapigs with brain filtrates did not show conclusive changes ; there was round-cell preponderance in lung-smears, and a few eosinophiles were seen, in one guineapig which died after 7 days.

It is suggested that the haemorrhages in the brain and lungs were probably due to N.A.B. poisoning, but that the lesions in the lung suggested an infective process rather than an anaphylactic one : the only finding suggesting a virus origin was the perivascular monocytic cuffing of the brain capillaries. The author asks whether " the virus of tropical eosinophilia activated by arsenic produced the cerebral lesion ".

This report is put forward as a contribution to the pathology of tropical eosinophilia, death from which does not appear to have been reported before.

[Whilst the cause of death in this case appears to be complicated and uncertain, the peculiar histopathological changes described are of interest and may serve to throw new light on this condition : it would be difficult to speculate on the possibilities of a viral aetiology on the evidence presented alone, or indeed to apportion that evidence between the various operative factors, in view of the arsenical encephalopathy : in any case, the use of the term " virus of tropical eosinophilia " is premature.] *H. J. O'D. Burke-Gaffney.*

GELBJERG-HANSEN, G. **Erythema chronicum migrans Afzelii and Meningitis after a Tick Bite.** *Acta Dermato-Venereologica.* 1945, Mar., v. 25, No. 5, 458–63.

JACOBY, H. **Cause, Symptoms and Treatment of Lathyrism. A Specific Nutritional Neuropathy.** *Indian Med. Gaz.* 1947, Feb., v. 82, No. 2, 53–8. [20 refs.]

LOWE, C. U. & AUGUSTINE, D. L. **Creeping Eruption in New England. A Report of Two Cases.** *New England J. of Med.* 1947, May, 1, v. 236, No. 18, 658–61, 1 fig. [16 refs.]

GENERAL ENTOMOLOGY.

PENN, G. H. **The Larval Development and Ecology of** *Aëdes* (*stegomyia*) *scutellaris* **(Walker, 1859) in New Guinea.** *J. Parasitology.* 1947, Feb., v. 33, No. 1, 43–50, 7 figs. on 1 pl. [10 refs.]

PARROT, L. & DURAND-DELACRE, R. Notes sur les phlébotomes LVI. Phlébotomes de Beni Ounif-de-Figuig (Sahara oranais). [**The Species of** *Phlebotomus* **in Beni Ounif-de-Figuig.**] *Arch. Inst. Pasteur d'Algérie.* 1947, Mar., v. 25, No. 1, 77–86, 5 figs. [34 refs.]

GILL, S. **Excessive Reactibility to Sandfly Bites.** *Acta Med. Orientalia.* 1947, Mar., v. 6, No. 3, 104–5, 2 figs.

The effects on man of the toxic salivary secretion of the sandfly may be very severe ; but previously susceptible persons may become desensitized or even immune after repeated exposure to bites.

The author records two cases to illustrate that (1) such immunity may be transitory and (2) it may be inherited.

The first case relates to a woman of 30 years who, on her arrival in Haifa in 1939, suffered from excessive reactions to sandfly bites. She had an allergic history. After a few weeks she became immunized against sandfly " venom ", but the reaction reappeared in severe form in 1944, five years later.

The second case relates to a 20-year-old woman who arrived in Haifa in 1938, in her third month of pregnancy. Early in the sandfly season, she developed a giant bulbous dermatitis, which lasted for some weeks. The following summer, she reacted to sandfly bites with small papules only : her newly-born infant did not react at all, until he was 4 years old, when he developed a vesiculo-bulbous dermatitis after sandfly bites. Afterwards, he developed immunity once more.

The author concludes that the child had inherited his mother's susceptibility to sandfly venom, together with antibodies against it : but his immunity was only temporary, and when it expired, he reacted excessively and thereafter produced immunity for himself. *H. J. O'D. Burke-Gaffney.*

HEATH, G. B. S. & MITCHELL, J. G. **Use of DDT against Sheep Ticks,** *Ixodes ricinus L.* **With a Statistical Note on Interpretation of Tick Counts** by K. L. BLAXTER. Reprinted from *Vet. J.* 1946, v. 102, No. 5, 130–40, 2 pls.

The tick *Ixodes ricinus* is primarily of veterinary importance as the vector of the virus of louping ill and other animal diseases in Britain. *Ixodes* spp. also carry the virus of the human disease Spring Encephalitis in Siberia.

Ticks are difficult to eradicate, and this paper gives an account of attempts to use DDT by incorporating it in a sheep dip in order to kill ticks attacking sheep. The results obtained were somewhat erratic ; in only 15 out of 27 field trials was good protection given to the sheep. This work indicates that, as has been found by other workers, DDT is a less efficient killer of arachnids than it is of insects. Further work may possibly ensure better effects sgainst the ticks of veterinary importance. So far, results do not encourage the use of DDT against ticks of medical importance. *K. Mellanby.*

DELPY, L. P. Révision, par des voies expérimentales, du genre *Hyalomma* C. L. Koch 1884 (*Acarina, Ixodoidea, Ixodidae*). Note préliminaire. [**Experimental Study of the Genus** *Hyalomma* : **Preliminary Note.**] *Ann. Parasit. Humaine et Comparée.* 1946, v. 21, Nos. 5/6, 267–93, 3 figs. [21 refs.]

DOUGLAS, J. R. **The Internal Anatomy of** *Dermacentor andersoni* **Stiles.** *Univ. California Publ. in Entom.* 1943, v. 7, No. 10, 207–72, 7 figs. & 19 pls. [49 refs.]

The tick *Dermacentor andersoni* has been shown to be the most important vector of Rocky Mountain spotted fever and also to be a carrier of tularaemia, various fevers, and tick paralysis. It may also carry other diseases.

This paper contains the first detailed account of the internal anatomy of the tick. The various systems are described, and many clear plates, diagrams and photo-micrographs are reproduced. This information is primarily of importance to research workers on the diseases mentioned above, but anyone concerned with tick-borne diseases and with the cycle of the causal organisms in the arthropod host will find this paper of importance. *Kenneth Mellanby.*

TARZWELL, C. M. **Effects of DDT Mosquito Larviciding on Wildlife. Part I. The Effects In Surface Organisms of the Routine Hand Application of DDT Larvicides for Mosquito Control.** *Pub. Health Rep.* Wash. 1947, Apr. 11, v. 62, No. 15, 525–54, 9 figs.

BORELL, A. E. & BRYANT, M. D. **Mammals of the Big Bend Area of Texas.** *Univ. California Publ. Zool.* 1942, v. 48, No. 1, 61 pp., 1 fig., & 5 pls. [32 refs.]

A list of mammals including a number of species of rats, which may prove of medical importance.

LABORATORY PROCEDURES.

VÁGÓ, S. Méthode de coloration pour l'examen microscopique des spirochètes. [**Staining of Spirochaetes for Microscopic Examination.**] *Schweiz. med. Woch.* 1947, Apr. 26, v. 77, No. 17, 479–80.

The author refers to the difficulty in obtaining a simple and reliable staining method which will be suitable for all types of spirochaetes. He notes the multiplicity of methods, based on different chemical reactions, which are commonly used, citing no less than eleven well-known techniques. Different species of spirochaetes vary in their capacity to stain, and most techniques have a limited field of usefulness. Methods based on modifications of existing ones have not, on the whole, proved satisfactory, in the author's view.

He has therefore elaborated a new method, which is not based on any of the existing ones. The procedure is as follows :—

The specimen, spread thinly on a slide, is dried in air, without fixation. It is stained with a concentrated aqueous solution of mercurochrome, washed in water, stained with a concentrated aqueous solution of Pyoctonin [methyl violet] and again washed in water.

The preparation is then ready for examination. The spirochaetes stain blue-black: the other microorganisms and elements are also stained "as in all other methods for staining spirochaetes" [the colour taken by these elements is not clearly stated].

The author states that this method stains not only those species which are readily stained by previous methods, but also certain pathogenic species which are notoriously difficult to stain. The microscopic picture is clear and the background clean: the spirochaetes stain intensely with sharply defined outlines. Practical advantages claimed are: fixation and heating are unnecessary, time is shortened and the shape of the spirochaete preserved; preparation of the stains is simple and no weighing is necessary; the solutions keep indefinitely: the time taken by the staining with the solutions is not important: no heating of the staining solutions is required.

The author states that the various species of *Leptospira*, usually difficult to stain, are shown up clearly and deeply stained by this method; in fact, contrary to usual experience, they stain more clearly than *Trep. pallidum*.

[A method claiming such a variety of advantages merits intensive study by others.] *H. J. O'D. Burke-Gaffney.*

COHEN, H. A. **A New Quick Method for Staining** *Treponema pallidum.* *Acta Med. Orientalia.* 1947, Mar., v. 6, No. 3, 99–100.

This author describes a method devised for reasons comparable to those given by VÁGÓ [above].

The chemistry of the method is discussed and the technique is then described. This technique is as follows:—

Serum from the lesion is spread as thinly as possible on a slide and fixed at once by covering it with 36–40 per cent. formalin solution and heating until evaporation is noted. The slide is then flushed with distilled water. For staining, the following are added:—

4 drops of a solution of equal parts of N/1 NaOH and N/10 NaOH.

2 drops of 5 per cent. $FeCl_3$ solution.

4 drops of N/1 hydroxylamine hydrochloride.

3 drops of 10 per cent. solution of pyrogallic acid.

The slide is heated until bubbles appear under gentle stirring. The slide is flushed with distilled water and a few drops of an ammoniacal solution of $AgNO_3$ in 0·5–5 per cent. solution are added. Staining is complete after a few seconds, when the slide is washed with distilled water and air-dried.

Trep. pallidum appears reddish brown on a light background under artificial light.

The author compared material from 14 syphilitic patients by dark-ground illumination, by Fontana's method and his own: Wassermann and Kahn tests were also done.

Positive results were obtained 6 times with Fontana, 9 times with dark-ground and 11 by the author's method: all the three negative specimens in the last-named series were also negative by the other two methods.

The method takes no more than one minute, and the solutions need not be freshly prepared. *H. J. O'D. Burke-Gaffney.*

KYKER, G. C. & MCEWEN, Mildred M. **Rapid Continuous Extraction and Determination of Quinine.** *J. Lab. & Clin. Med.* 1947, Feb., v. 32, No. 2, 196–205, 1 fig. [19 refs.]

The authors describe and illustrate a simple apparatus for the continuous extraction of quinine from biological material, adaptable for use with solvents of specific gravity greater or less than water, and allowing a saving of time and labour. After alkaline digestion of the tissue, an aliquot portion of the digest is extracted with the appropriate solvent ; the base, when taken up in acid, can be estimated by any of the established methods including turbidimetric, fluorimetric, colorimetric, or spectrophotometric. The procedure is of value where wide variations occur in the alkaloidal content of the samples.

The following is the author's summary :—

" A rapid procedure is presented for the quantitative separation of quinine from biologic fluid or tissue by continuous extraction of a digested sample with chloroform. Specially designed apparatus which is simple in construction is described in various dimensions. The extractor represents an interchangeable adaptation of one proposed previously, so that the complete unit permits extraction with solvents of either greater or lesser density than water. The procedure enables the versatile selection of two or more established methods of analysis for simultaneous application to individual samples and stresses the value of this practice in metabolic studies since no specific method is available for quinine. The procedure has proved efficient and convenient during extensive use in animal work." *J. D. Fulton.*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS.

QUEENSLAND INSTITUTE OF MEDICAL RESEARCH. Brisbane. **First Annual Report Year ended 30th June, 1946.** [DERRICK, E. H., Acting Deputy Director]. 7 pp.

This new Institute was established in 1946 as a result of proposals originating in 1944 ; it is controlled by a Council under the chairmanship of the Director-General of Health and Medical Services, Sir Raphael CILENTO. The functions of the Institute are to conduct research into any branch of medical science, but there is an emphasis on Queensland fevers, lead poisoning, virus diseases, industrial diseases, nutritional and social conditions, climatic conditions and tropical diseases of Queensland.

The Institute is temporarily housed in a building used by the Army, but it will eventually have its own buildings in association with the Pathological Department of the Brisbane Hospital. In the present report the acting Deputy Director, Dr. E. H. Derrick, shows that there has, as yet, been little opportunity for scientific work. There is no doubt, however, that an Institute founded under such auspices, and maintained, as this will be, by the Government of Australia, will be a centre at which research work of the usual high Australian standard will be carried out. *Charles Wilcocks.*

MONOD, T. En marge des problèmes médicaux africains. [**Problems Ancillary to Medicine in the African.**] *Bull. Acad. Nat. Méd.* 1947, v. 131, Nos. 15/16, 280–85.

A survey of the objects of the *Institut Français d'Afrique Noire,* which concerns " the African and the medium in which he lives ". An interesting account of the biological and sociological approach, which should be read in the original. *H. J. O'D. Burke-Gaffney.*

BLANC, G. De l'utilité des connaissances zoologiques pour l'étude expérimentale des maladies exotiques. [**The Value of Zoological Knowledge in the Experimental Study of Tropical Diseases.**] *Bull. Acad. Nat. Méd.* 1947, v. 131, Nos. 15/16, 276–9.

CALIFORNIA MOSQUITO CONTROL ASSOCIATION. **Proceedings and Papers of the Fifteenth Annual Conference of the California Mosquito Control Association held at Agriculture Hall, University of California, Berkeley, California, December 13–14, 1946.** 154 mimeographed pp., 9 figs.

Much of the material contained in the proceedings of this Conference is largely of local interest, but there are a number of useful papers and notes on the recognized larvicides and mosquito control measures generally. Other subjects dealt with include arthropod-borne virus encephalitis; a full and useful description of the structure and scope of the U.S. Public Health Service Communicable Disease Centre, illustrated with maps and diagrams, and some account of recent literature relating to insect-borne disease, by Professor W. B. HERMS, Emeritus Professor of Parasitology, University of California.

H. J. O'D. Burke-Gaffney.

HUMPHREYS, F. A. & CAMPBELL, A. G. **Plague, Rocky Mountain Spotted Fever, and Tularaemia Surveys in Canada.** *Canadian J. Pub. Health.* 1947, Mar., v. 38, No. 3, 124–30.

In 1938, the Dominion and Provincial Departments of Health of Canada initiated surveys on plague, Rocky Mountain spotted fever and tularaemia. This paper represents the results of eight years work of this survey in Western Canada.

The survey covered southern Alberta and British Columbia and southern Saskatchewan, later including minor surveys in the ports of Halifax (Nova Scotia) and Saint John (New Brunswick) and also areas adjoining army camps in the three Prairie Provinces.

Plague: Rodents (except mice) were dissected in the field and suspicious lesions removed; later, in cases where no evidence of suspicious lesions was found, a tissue pool of five or more animals was taken, and the macerated tissue transferred to guineapigs either by scarification or by subcutaneous injection of filtrates in saline: the latter method is preferable, but is only indicated when the tissues are fresh, as otherwise the material is toxic to guineapigs.

Fleas were dealt with in lots of 100, which were ground as one specimen and injected into guineapigs in saline suspension: where *P. pestis* was present, the infection found at autopsy was passed to another guineapig and to one or two white rats, and cultures were obtained.

No evidence of plague has yet been found in British Columbia: in Alberta, *P. pestis* was found in ground squirrels yearly from 1939–1942 and again in 1945; six of 817 tissue specimens and 32 of 939 flea specimens were positive. It is now known that an area of many thousand square miles in south-east Alberta is infected.

The infection was found in Saskatchewan, in Richardson ground squirrels, for the first time in 1946, in an area adjacent to the infected part of Alberta. Two of 356 flea pools from 7,448 ground squirrels were positive.

Species of rat fleas were determined in each area, and the "cheopis index" determined: in the Vancouver-New Westminster area this was about 0·69, indicating that *Xenopsylla cheopis* was fairly abundant, but this species was not found in other cities on the British Columbia coast.

Of the rats found, 95 per cent. were *R. norvegicus*, 4 per cent. *R. rattus rattus* and 1 per cent. *R. rattus alexandrinus*. It is noted that the black rat (*R. rattus*

rattus) was found at Nelson, B. C., some 500 miles from the coast, in addition to water front areas.

No plague infection has yet been found in mice during the course of the survey.

It is evident from this survey that plague is well established in ground squirrels in south-east Alberta and that it has now gained a foothold in neighbouring Saskatchewan. So long as the infection is confined to ground-squirrels, which do not ordinarily come into close contact with the human family, the risk is not great ; but if rats invade the area and become infected, the problem will be serious. Rats were at one time unknown in the Prairies, but are now well-established in the larger municipalities of Manitoba and Saskatchewan, though they do not yet seem to have colonized to any extent in Alberta. Rats have been prevalent on the west coast of British Columbia since the earliest times.

Rocky Mountain Spotted Fever : Three of the ticks known to occur in Canada are proved vectors of this disease, namely (1) the Rocky Mountain wood tick (*Dermacentor andersoni*), common in a recognized area in the south of the three western Provinces; (2) the American dog tick (*D. variabilis*), found in south-eastern Saskatchewan, Manitoba and in some parts of the eastern territory ; and (3) the rabbit tick (*Haemaphysalis leporis-palustris*), distributed throughout Canada, but found only on rabbits and certain birds. Infected rabbits carry a very mild strain of rickettsiae ; it is suggested that the rabbit tick provides a source from which virulent strains of *R. rickettsii* may arise.

The only tick known to harbour virulent *R. rickettsii* in Canada at present is *D. andersoni* : evidence of its infection was found in five lots of 72,227 ticks in British Columbia and ten of 49,201 in Alberta ; all ticks from south-west Saskatchewan proved negative, although a few cases of the disease have been reported from there.

The authors discuss the difficulties surrounding the interpretation of tests for infectivity in ticks : frank infections have rarely been induced in test animals, but positive immunity tests were frequent ; these were open to doubt as immunity was also demonstrated in control animals. It is suggested that failure to recover *R. rickettsii* from ticks should not be relied upon as an indication that the area concerned is free of infection ; it may be that strains which are mild and latent in guineapigs might prove highly pathogenic for human beings.

Tularaemia : In the course of the preceding investigations, a constant watch was kept for the presence of tularaemia, in view of its insidious and highly infectious nature. The disease seems to be widespread in the Western Provinces: in this survey, it was found 38 times : Alberta accounted for 29 of the findings, British Columbia for 7 and Saskatchewan for 2. The commonest host was *D. andersoni*, but the organism was also found in other ticks, in ground squirrels, rabbits, mice and a bird. The infection was found recently in a house mouse (*Mus musculus*) in the coast area of British Columbia where the disease had not been recorded before : this is apparently the first recorded spontaneous infection in the house mouse in the American continent ; the *Br. tularensis* in question was very virulent for white mice, but relatively low in virulence for guineapigs ; it was quite atypical until it had been passed frequently through laboratory animals.

H. J. O'D. Burke-Gaffney.

BOOK REVIEWS.

DE SOUZA-ARAUJO, Heraclides-Cesar [Chefe da Secção de Bacteriologia e do Laboratório de Leprologia do Instituto Oswaldo Cruz]. **História da lepra no Brasil. Vol. I. Períodos Colonial e Monárquico (1500–1889).** pp. xiii + 559, 40 pls. 1946. Rio de Janeiro : Imprensa Nacional.

It is difficult in a brief review to do justice to the author of this momentous work. A folio book of over 500 pages, every one of which is indicative of painstaking historical research, careful selection of material, sustained interest in recording, cannot be dealt with adequately in a few lines. Selection of the salient features must be made. This volume tells the story of leprosy in Brazil from 1500 to 1889. After discussing the source of the disease in Brazil, the author takes up period after period, telling of the prevalence of the scourge and its progress, the confusion in diagnosis from time to time, the measures taken for dealing with the patients and preventing spread among the healthy. Professor de Souza-Araujo presents a general statement of the question as it stands at the beginning of each period, a sort of *interim* summary replete with information. Every fact mentioned as of importance during the period of nearly 400 years is vouched for by transcriptions of documentary evidence, addition a interest being afforded by much of the correspondence being reproduced in facsimile.

There has been considerable conflict of opinion as to the origin of leprosy in Brazil. CHICO has stated that the Spaniards found many cases of the disease when they first went to Mexico in 1519, and he believed that infection had been imported from the Sandwich Archipelago with which Mexico had been in touch from ancient times. It has been stated that Cortez, the Conquistador, noting the number of lepers, founded a hospital for their isolation and treatment on the border of Lake Texcoco, near Mexico City. Others have maintained that what has been called *morphoea* or *leprosy* in these early days was in reality *mal del pinto*, while the mutilations, particularly the facial, depicted in ancient pottery resemble the lesions of espundia (leishmaniasis) rather than those of leprosy.

It is always pleasant for a reviewer to find confirmation of his own theories and conclusions in the independent and deeper researches of another, hence it is gratifying to note that Professor de Souza-Araujo, from his intensified studies, reaches the conclusion that leprosy did not exist among the aborigines of Brazil. Manoel DE NOBREGA (1549–60) in his work on the local diseases makes no mention of any which could be interpreted as leprosy. THEVET, a Frenchman born in Angoulême in 1502, went to Brazil in 1555, mingled with the various tribes and noted their diseases : he had knowledge of leprosy from his previous travels, but does not refer to it as existing among the indigenes of Brazil. DE LERY, Soares DE SOUZA and others of the sixteenth century, EVREUX, Piso DE LIEBSTAD and others of the seventeenth, describe many of the diseases of the country ; not only do they not report any cases of leprosy, but the last-named goes further and states definitely that leprosy was not known there. In short, evidence goes to show that the disease was introduced by immigrants from Europe, first by the Portuguese in 1496 , secondly from Spain, and thirdly from France, especially Brittany and Normandy, whence sailors made frequent voyages to Brazil and some settled there. In France, in the fifteenth century, there are said to have been 750 leprosaria. Lastly, Holland had many lepers in the fifteenth and sixteenth centuries and migration to Brazil was commom even in the fifteenth and increased greatly in the succeeding century.

Another and even more fruitful source was the slave traffic. Madeira and the Canary Islands were centres of the commerce from West Africa and transshipment was arranged to Spain and Portugal and thence to the west and to

Brazil in particular. So thriving was the trade that in 200 years a census gave the population of Brazil as three and a quarter millions, of whom 31 per cent. were Europeans, a little over 7 per cent. were indigenes, the remaining 61 per cent. being Africans, four-fifths of whom were imported slaves brought from the "first home" of leprosy, the land where even today its endemicity is greatest.

By the end of the sixteenth and beginning of the seventeenth centuries the prevalence of the disease was causing alarm and the question of establishing a leper hospital was debated. Reports have stated that one such was founded in 1637, but investigation rather goes to prove that this was the year when appeal was made for control of the many lepers who were roaming at will about the towns. Whether any establishment was erected in consequence of the appeal and, if so, where, is not certain. There is a belief, supported by legend rather than by evidence, that a "leper camp" was set up, and this is adduced as accounting for the Chapel of St. Lázaro in Salvador, Rio de Janeiro.

The first known leper hospital of importance was decided upon, to receive 52 patients, at São Christovão in 1741. Next, a Commission was held, by order of the king, which brought out a regulation that, since leprosy was contagious, all cases of the disease must be isolated, regardless of class distinction; this led to the inauguration of lazarettoes with separate sections for the sexes and for different social classes. Compulsory notification was instituted, and the local medical officer of health was given authority over all lepers; a warning was given of the possible confusion between leprosy and syphilis, and careful examination of imported negroes was ordered.

There seems to have been even further delay, for a *verbatim* copy of the letter, or deed, is given showing that on January 31st, 1765, the Jesuit seminary of São Christovão was legally assigned as a leper hospital. When it was opened it could accommodate 100 patients. It was near the sea, with a river of sweet water, a large flat piece of ground for agriculture, pasture for milch cows, and had a central chapel, accommodation for nurses, surgeon and staff, slaves, and a kitchen and laundry. A copy of the Statutes is reproduced, giving the general rules for discipline, the duties of the physician, nursing staff, arrangements for accountancy and salaries, etc.

Interposed here is a chapter describing the introduction and spread of the disease in the interior of Brazil during this period, in Pará, Pernambuco, Bahia, São Paulo and Minas Geraes. Many interesting points are to be found in this section, but limits of space forbid our speaking of them. Between 1808 and 1821 difficulties multiplied. In 1809, part of the hospital grounds was let to Nicolau Vicini, for erection of a mill, and three years later another part to Francisco Walis for a cloth factory, and attempts were made to interfere with hospital administration. In 1816, owing to the need for housing the military, it was decided that the hospital should be taken over and converted into barracks. A new site had to be found for the lepers and in 1817 Ilha das Enxadas (or Inchadas) was determined upon and the transference was made in October of that year. This was not, however, occupied for long. As early as 1818 complaints were received that the site was not satisfactory and that the water supply was inadequate. In the meantime other hospitals were founded in other Provinces—at Belém in Pará, at Cinabá in Matto Grosso, in São Paulo and Minas Geraes.

As early as 1816 orders were being promulgated for protection and giving aid to children of lepers and for inspection of those boarded out, so as to guard against abuses.

From 1821 complaints became constant. The soil of Ilha das Inchadas was dry, water supply insufficient, there was lack of vegetation and lack of milk. So, in February 1823, another move was made, this time to a site on the Ilha

do Bom Jezús, in the Bay of Guarnabara, where it remained as the National (or Imperial) Hospital for nearly another decade. Complaints here too were frequent. The water was not only insufficient, it was very liable to pollution, not only "aggravating the terrible disease from which they all suffered [leprosy], but spreading other grave diseases, dysenteries, constipation, inflammation of the liver and stone in the bladder." Administration difficulties arose; patients absconded, charges of tyranny and ill-treatment were made (one but on investigation shown to be unfounded and put forward falsely by malcontent patients). Finally the decision was reached to make yet another move and it was resolved to reopen the old site at São Christovão; the housing plans had run full circle and in August 1832 the lepers returned to their first home. By decree, the support of the afflicted "by voluntary contribution" was replaced by a Government grant for their maintenance. Naturally, the local residents protested against the return of the lepers, but their protest came too late, six months after the transference had taken place. The appeal was, nonetheless, brought up for discussion and consideration at a session of the Rio de Janeiro Medical Society in 1833. This Society has had an honourable and prosperous career. Later, it became the Imperial Academy of Medicine and its publications appeared as the *Revista Médica Brasileira* at first; later under other names between 1849 and 1906 when it was denominated *Boletim da Academia de Medicina*, a title which it still retains. Some of the fruitful discussions at meetings of the Society are recorded and *verbatim* reproductions of some of the papers read are included in this book. Other interesting matters are, as addenda to chapters II–V, copies of important, hitherto unpublished, documents from the Colonial Historical Archives at Lisbon, detailing the Proceedings of a Medical Congress held at Rio de Janeiro in May 1840, a plan for leprosy prophylaxis, testing of new drugs, Sipo d'Onca and Cashew, of the use of snake venoms, and, lastly, *Carpotroche brasiliensis*, the Brazilian chaulmoogra, which alone of all of them has fulfilled some at least of its expectations.

The work is embellished not only by *verbatim* records of correspondence but by facsimile reproductions of many of the letters and decrees and by photographs excellently reproduced. The paper is good, margins wide and the print clear. To sum up: The author has made the utmost use of the opportunity which his position has afforded him of being able to study documents inaccessible to most and the result is a volume of surpassing interest to the historian of tropical medicine. *H. Harold Scott.*

DAWES, Ben [D.Sc.(London), A.R.C.Sc., D.I.C., F.L.S., Lecturer in Zoology at King's College, University of London]. **The Trematoda. With Special Reference to British and other European Forms.** pp. xvi+644, 81 figs. 1946. Cambridge University Press. [52/6].

This detailed study of Trematoda of representative animals from the European fauna will be welcomed by students, teachers and research workers in zoology, as well as by specialists in helminthology. The account of the Trematoda of medical importance in the tropics is necessarily limited, and is mainly to be found in the chapter on "Some Trematoda of Mammals" which contains brief references to the species occurring in man. *J. J. C. Buckley.*

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